

DE
SUCCO
PAN-
CREATICO
—
DE GRAAF

TR.
PACK

1676







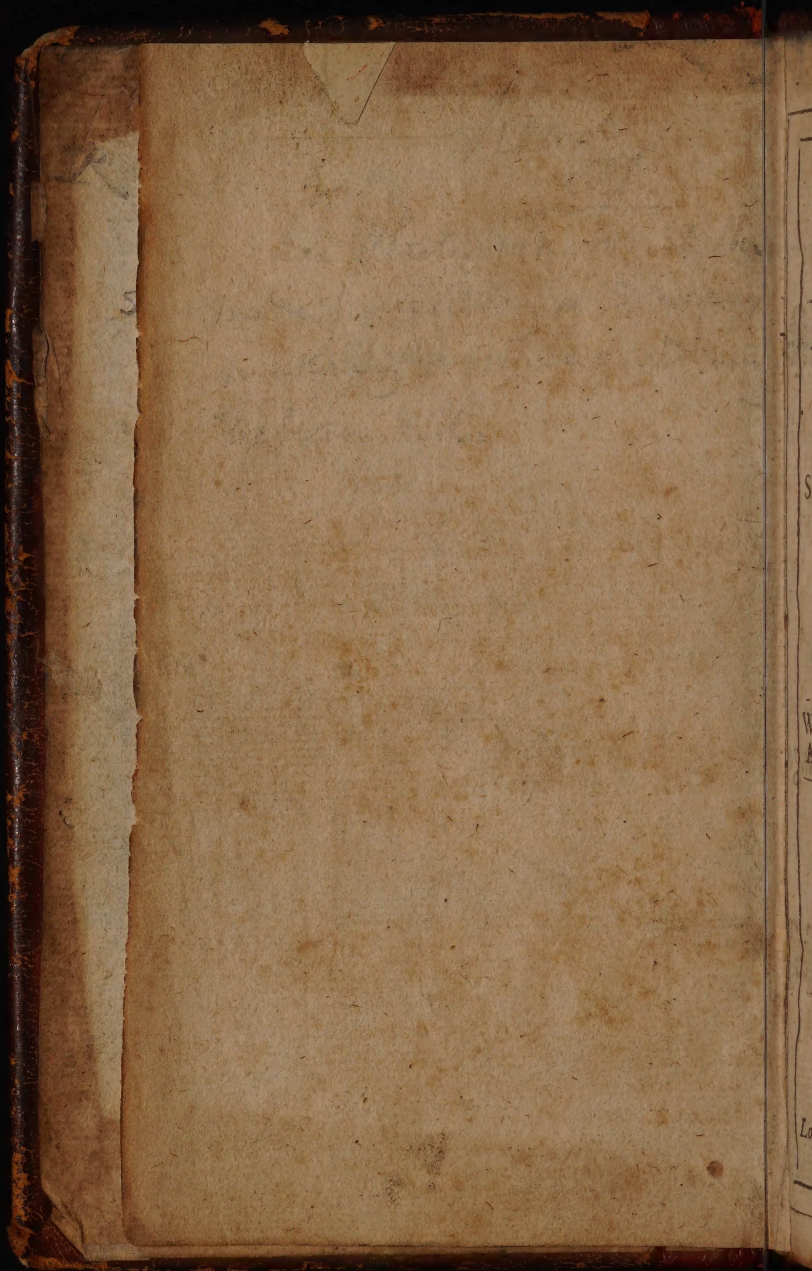
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DE
Succo Pancreatico: Or,
A Physical and Anatomical
TREATISE
Of the NATURE and OFFICE of the
Pancreatick Juice;

Shewing its generation in the Body, what Diseases arise by its Vitiatioⁿ; from whence in particular, by plain and familiar examples, is accurately demonstrated, the Causes and Cures of Agues, or Intermitting Feavers, hitherto so Difficult and Uncertain: with sundry other things worthy of Note.

Written by *D. Reg. de Graaf*, Physician of *Delph*,
And Translated by *Christopher Pack*, *Med. Lond.*



London, Printed for *N. Brook* at the Angel in
Cornhil near the Royal Exchange, 1678.

DE
SINTO PARNATIO: DE

Physical and Anatomical



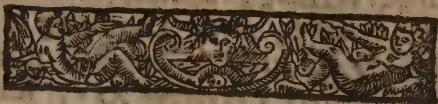
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February 2d. 1675.

Roger L'Estrange

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To the most ILLUSTRIOUS
D. JOHN CAPELLANUS,

Councellour to the most Christian
KING.

Sir,

Exmpte **T**HIS Treatise, which five Years
since, I willingly Dedicated to
You in the *French Idiom*, is
now again presented to Your
self, replenished with many Observations
in the Latine Tongue: seeing that by the
great esteem of Your Name, our *French*
Edition was not only Candidly accepted
in *France*; but also in other Forreign
Nations among Learned Men: The
exceeding happy success of which, had
wrought in me an Admiration, had not
the fame of Your Transcendant Lear-
ning made it Immortal, by your most
A 2 Learned

The Epistle Dedicatory.

Learned Writings, known, and thoroughly considered by me. You being so well versed in all kind of Studies, that the most Illustrious *Ludovicus XIV*, King of *France* and *Navarre*, made You the *Arcanist*, or *Cherisher* of most Learned men. Since it is so, I may remember the former Edition, and so much the rather, seeing that the Heer *Duyt van Voorhout*, a Man of an excellent Genious, made use of as certain of Your Peculiar Favours towards me, as Your own frequent Honouring me with your Epistles: Wherefore with all Humility I crave, that even as You protected the former Edition, under the Shield of Your Authority, so You would vouchsafe also to protect This. The doing of which, will oblige him of the highest Nature, who is, and will be during his Life, the Adorer of Your illustrious Name.

Reg. de Gra

T



THE

PREFACE.

IN the Year 1663. in the University of Leyden, I hearing the most Famous, and Indefatigable Man in Studies, Francis de le Boe-Sylvius, daily teaching concerning the Pancreatick Juyce, to be one of the chiefest Foundations of Physick, I endeavoured to find out that, hitherto undiscovered Juyce; the which when I had done, and indeed after that manner which he had first described to us; he having understanding thereof, with all Diligence did invite me to Print those things, which I had observed worthy of Notice, concerning this Subject, through diverse Dissections of various Animals: And I, willing to gratifie his Request, published a little Treatise, concerning the Nature, and Office of the Pancreatick Juyce; which, although in an unpolished manner, nevertheless, it so took with the Curious Indagators of Nature, that in a short time, sufficient Examples of that Nature, were desired of me: For which cause, in the Year 1666, I published, at paris, this little Treatise, in the French Tongue; which, three or four Months

The Preface.

together, I presented to the Famous Dr. Bourdelot, to be publickly examined; to whose House the most Curious Wits of the University do frequently resort. And I, seeing that this second Edition wonderfully took with the most Learned Physicians of all France, who have their College at Paris, and returning to my own Country, I found that there were remaining no Copies of my First Edition, being instigated by the Printer, and my Friends, for their sakes who understood not the French Tongue, have again turned the same little Treatise into Latine, and that not barely, but in several places have inserted new Observations, and resolves to severall Objections, put to me against this Treatise, both in France, and other Countries, that my Opinion might not seem, in any Respect, to be faulty. So that, the Treatise, which I now publish, may bear the name of a new one; which I hope, will not be unacceptable to the Reader. But seeing no writing (as Plato saith) can be so exact, that it may avoid the Censures of Criticks, without doubt, there will be Carpers, who are better affected with Brawlings, and Drinkings, than the Dissections of Bodies, which will laugh at me for the spending so much time in the discovery of this Juycce: But Hippocrates, in an Epistle to Damagetus, hath taught me in an History of Democritus, that those Gibeings ought not to be regarded, &c. So much of which History as most nearly appertaines to us, I will briefly relate. Democritus, inferiour to none of the Abderitans, when, to find out the nature of the

Bile

The Preface.

Bile, had betaken himself, apart from the City, and there alone had dissected many Animals; he was generally reputed to be mad; wherefore the Senate, and People of the Abderitans being sad, and troubled, did very much importune the Prince of Physicians, that he would vouchsafe to come, and cure the madness of Democritus; Hippocrates, by the Merits of Democritus, and the Intreaties of the Abderitans, taking Ship went to Abderis, where he found all the Citizens, and Inhabitants gathered together, waiting for him without the Gates; part of whom running before, and part following, led Hippocrates to a high Hill without the City, (crying out save, help, heal,) that he might see the Madness of Democritus: From whence they saw Democritus sometimes dissecting Animals, sometimes musing, and sometimes writing, Hippocrates, going all alone to Democritus, and making an exact tryal of him, although then he understood he was not mad, asked him what he wrote there? Democritus answered concerning Madness; And being further asked, What he wrote of Madness? said, What else, than what it is, and how generated, and how allayed in the Bodies of Men? For, these Animals, which you see here, that I open for this purpose, is not because I hate the Works of God, but search out the Nature and Seat of the Bile: For, you know, this is the cause of Mens Madness, &c. Which being understood, saith Hippocrates, Democritus in truth, I call God to witness, you speak truly, and wisely;

The Preface.

And he, returning to the Abderitans, who waited for him at some distance, commended Democritus, and accused themselves of Madnes. I wish Hippocrates, the great Prince of Physitians, might rise from the Dead, he would not blame those less, which deride me for my more diligent search of the Pancreatick Juycce, than them which judged Democritus to be mad, for his exquisite enquiry into the Bile: Seeing that he thought them to be taught of God, which did not only study about Heat, Cold, Dryness, and Moisture, but about their Causes: For, it is not Heat (saith he) Lib. De Vet. Med. Text XXVI. XII. which hath great force, but Sharpness, and Fluidity, and other things by me related. And he saith before Text XXIV. XX. Because there is in Man both bitter, salt, sweet, acid, sharp, and fluid, and infinite others, having all manner of Faculties, both of Plenty, and Strength. From whence he commonly calls those Faculties, and Powers he affirms Salt, Bitterness, and Acidity, with other things of the like Acrimony, to be commonly the causes of all Distempers, as appears Lib. cap. Text XXV. From which it is as evident, as the Sun at Noon-day, that Hippocrates, if he were alive, would judge our Dissections, and Searchings, about Salts, Acids, and other Faculties, sometimes abounding in the Pancreatick Juycce, to be highly necessary. In regard Hippocrates, and other of the Antients, who were famous in their time, were altogether ignorant of the Pancreatick Juycce; neither did they under-

The Preface.

understand the whole depth of Nature; It is not to be imputed to them as a Fault. But on the contrary, those famous, and chiefeſt Guides of Wiſdome, and Inciters of Wits, are to be commended; becauſe they broke the Ice for us; and (as it is ſaid) thoſe things which we read, were rightly invented, and obſerved by them, are to be candidly embraced; and thoſe things, which we really know to be falſe, and erronious, I judge they ought to be corrected with ſuch Modesty, as we deſire thoſe things, which we now write, ſhould be corrected with. If we conſider a Thouſand Years yet to come, ſomething may be found out, which will correct, and amend our Writings, by the unwearied Searchers of Nature; for Arts admit of a daily Improvement, eſpecially in this age of ours, in which the Token of Authority being ſhock off, we may bring to the Teſt thoſe things which our Reason and Senſe doth afford us; for, the Enquirers into things Natural ought not to diſtruſt themſelves, or ſo doubtfully to follow the ſteps of their Anceſtors, as at any time, when they ſhall diſcover Novelties, be afraid to publiſh them.

Non omnia grandior ætas
Nos æque Scimus habet, ſeris Venit
Uſus ab annis.

Antient times not all things knew:

For, Prætiſs ſprang from Tears more new.

And as much as pertains to this Treatiſe,
of

The Preface.

of ours, which hath been so illustrated with daily Experience, new Observations, and Reasons, that they who first made a Question of the Truth of our Hypothesis, would be on our side; or at least confess, till now, never any Systeme was found out, in which fewer, or lesser difficulties are, than this of ours, if they will but examine our Dictates without Prejudice, and Envy. First of all, Let the Reader be perswaded in himself, that our Pancreatick Juyce is no Fictions, but a real Humour of our Bodies; and such a one indeed as after its own separation from the Blood, and Propulsion, to the Intestines, is in a short time after, again permixed with the Blood, seeing that all Liquid things, be-

* The Origin. ing carryed by the passage of
is Thalamus. the Guts, do easily ascend (by
the Vena Lactea) the first *Treasury of the Living, and the last of the Dead.

Which being granted, he may further consider it was not (by the Almighty God) ordained in vain, but for a common use to the Body; and so all men will be easily perswaded, that as often as the Pancreatick Juyce is rightly constituted, its use doth naturally happen: And likewise when it happens preternaturally, then it is vitious, and preternatural: Seeing it is so, and my whole Treatise consists in the preserving a good Order of the Pancreatick Juyce, and amending it when vitiated, and helping Distempers from thence arising, we hope it will be very acceptable, and profitable to Practitioners: For, let this be its whole designe, to give a helping hand

The Preface.

hand to all who profess Physick, that they may sooner, safer, and more delightfully help the Calamities, and miseries of the Sick: And if I unhappily miss my aim, you may commend my Designe, and modestly correct those things in which the weakness of my Genious doth mistake: And if any one please to inform me better, I will allow him to convince me of my Errour, and not to accuse me of Obstinacy, seeing that I am not moved by Ambition, but only desirous of finding out Truth, offer up these my Studies unto you.

TO

To the Right WORSHIPFUL
St. CHRISTOPHER PACK, Kt.

The Translator Dedicates these His
ENDEAVOURS.

Honoured Sir,

Cujusq; ingenium non statim emer-
get, nisi Materia, Fautor, oc- Plin.
casio commendatorq; contingat, Epist.
(saith the Learned Pliny) 2.lib.6.

the Work and Ingenuity of every Per-
son doth not constantly prosper well, unless the
matter or occasion be remarkable, or some
worthy Patron happen to favour it.

As for the Matter, it hath already commended
it self to the World, and crowned the Lear-
ned Author thereof (throughout the *Europe-
an* Division) with an honourable Acceptation,
and Estimation, both in respect of the Inven-
tion, and Doctrinal Performances.

But in regard that I have assayed to make
it more Universally Intelligible, and Benefi-
cial to *English* men, by putting it into our own
Native Idiome, I conceive I ought to present my
Undertaking to the Patronage of some worthy
Person; under the Protection of whose Name,

RHT

it

The Epistle Dedicatory.

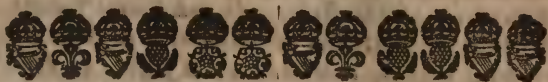
it may have the freer passage through the World. To which end I have thought no Person fitter than your worthy self, both in respect of Your profound Judgment, and Favour to all things that may advance a Publick Good. Neither could I do less, if the Bonds of Gratitude be any Obligations to the minds of men, seeing (that next to my Parents) I stand more highly engaged to Your Worship, than to any other Person living; which hath been a great Motive and Inducement to this Presumption, which I hope Your Candour will pass by, and Candidly accept this mite from him who at the present, is not capable of a better Retaliation of Your many Favours, than the humble offer of this Translation: The which, having been brought forth in Your Name, I knew not how it might better live than in Your Family; the kind aspect of which, will not be only Amicable to it, but also Honourable to him that is,

SIR,

*An Honourer of Your Self,
and Progeny.*

Christopher Pack.

THE



The TRANSLATOR to the
R E A D E R.

Candid Reader.

I Having often viewed this Treatise of the most ingenious D. Regnerus de Graaf, and many times also heard it wished for in English, at length Resolved to Translate it for their Sakes to whom the Original was not Communicable, in Regard of their Nescience of the Language, though otherwise competently ingenious and intelligent. The which I am well satisfied will prove servicable (and I hope also acceptable to them) in three Respects.

First, that it will be of great Utillity, for the more compleat understanding the Works of the Learned Franciscus Sylvius de le Boe that late Renowned Professor of Physick in the University of Leyden, the first part of whose Praxis is already in English; for in regard that he urgeth the Pancreatick Juice to be an Agent of Fermentation and Concoction of the Chyle, and
so

The Translator to the Reader.

So consequently a constitutive part of the Blood, and Author of many grievous Diseases, and Enormities of the Body. It necessarily follows
1. That the certainty of this Juice ought to be known; that is, that it be a real Juice, or Humour in all Mens Bodies, and not a thing only imaginary or uncertain, which this Author hath evidently demonstrated. 2. The way and manner of collecting it, by sensible Experiment (the surest of Guides) to convince those who oppugne, and resolve the Doubting, which he hath largely shewn. 3. Because the Anatomical Disquisition of the Pancreas, and its Juice, is omitted by Sylvius, in the first part of his Praxis, as not pertinent to his present Scope, which omission this Book supplies, and to which the said Sylvius, in a manner, refers his Readers: So that he which deliberately reads this Book, will be thereby highly inducted to the Understanding of the Doctrines and Notions of the most Learned Sylvius, concerning the Pancreatick Juice, throughout his whole Writings, as they relate to diverse Diseases, and Affections of the Body of Man.

The second Commodity I shall propound is, That this Book doth most Indubitably contain the certain Causes of all Agues, or Intermitting Feavers, with their true and effectual Rule of Curation. It is a wonder to see the many Books which have been written concerning Agues, and Feavers, (perhaps as many as there are Old Womens Medicines for the cure thereof) and the great Diversity of Opinions concerning their Causes,

The Translator to the Reader.

Causes and differences; so that, for a man exercised with a tedious Ague, to call a Council of Physitians to his Assistance, usually received no more Relief, than a Criminal Person doth by the Verdict of a Jury, which delivers him from Prison, either to Death, or Banishment. Which hath formerly enrolled this Disease in the Catalogue of those which were wont to be termed Opprobrium Medicorum, the Reproach of Physitians.

Neither, in my Judgment, is it greatly to be wondered at, that Physitians were wont to have no better success in the Cure of this Disease, seeing they were involved in so many Uncertainties about the Seat, and Cause thereof; some assigning the Seat to be in the Blood in general, others in some perticular Parts of the Vessels, where the Blood happened to be stagnant; others in the Meseraick Veines; others in the Guts, and particularly in the Colon, and several other Conceits, as if they went about to gain the Knowledge of the true Seat, Arithmetically, by the rule of false Position. Then again, as to the Causes, and Reasons of Differences, whilst they ascribed them to the Four Humours, viz. Blood, Choler, Phlegme, and Melancholy, and their different Degrees of Mixture, and Putre-Faction, they ran upon such Rocks as constantly ship-wracked the Barks of their Opinions: For, still, as they endeavoured to solve one difficulty that would arise, they caused the Rise of another. But this Author's Hypothesis,

(a)

The Translator to the Reader..

pathesis, being so free from all Intricacies, and Difficulties, renders it agreeable to Truth.

I have yet further to say in the behalf of its Certainty, that is the Consequence of Curation; which, although every single Cure of a Disease doth not indeed declare the Administrator of the Medicine, to have a certain Intelligence of the Cause of the Disease; yet, when a Distemper shall be certainly cured, at divers times, in different Persons, and with different Medicaments; alwayes from the Notions, Doctrines, and Considerations of the same Cause, that surely is a certain Argument that the Cause is known. And this I my self have oftentimes done even to Admiration, by removing Ague-Fits in a few dayes space, and never yet failing of the Cure of any kind of Ague, whether Quotidian, Tertian, or Quartan, with their Compounds; and am yet (by God's blessing) ready, at any time, to undertake the cure of the worst Ague-Fits that are; which Acquisition, I acknowledge, I owe to this Author: I am able also, to perform the same in those deplorable Fits, commonly called, The Fits of the Mother.

I have instanced this not out of boasting, but to shew the certainty, and excellency of the Doctrine of the Pancreatick Juice, and to excite the Reader to a serious Contemplation, and Observation thereof.

There

The Translator to the Reader.

There is yet a Third Utillity of this Book, which is, That it refutes several Errours in Physick, and Anatomy; many of which, in times past, have been received for certain Truths, and some of them perhaps yet remaining; the Principle whereof relate to the Pancreas, or Sweet-Bread; and to the Nervous Juycce; concerning which, I shall say no more, but commit you to the things themselves, as they shall occur by reading.

I have nothing more to say, but to beg the Readers kind Acceptance; and to call to mind him of the Difficulty of things of this Nature, (especially when an Author writes in such a style as de Graaf hath done) that if he meet with any Errours committed by me, I hope he will the more easily pass them by, as not being Intentional; and I presume not Essentially.

If I find this be kindly accepted, it will encourage me to serve my Country with some-what of my own, more at large.

I do expect to be censured, and snarled at by some (for as Erasmus saith, *Nihil morosius Hominum Judiciis*) there is nothing more peevish than Mens Judgments, I shall easily dispense with it, being of a peacable Spirit: And as I have professed to do this for a Publick Good, so I also declare, that I have been void

The Translator to the Reader.
of Prejudice therein, to all Mens Persons, and
Interests; being only desirous of the Propaga-
tion of all Laudable Science, whilst I
am

Christ. Pack.

From my House, at the Signe
of the Globe, and Chymical-
Furnaces, in the Postern,
near Moor-Gate, Feb. 2d.
1671.



AN





AN

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OF THE

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CHap.

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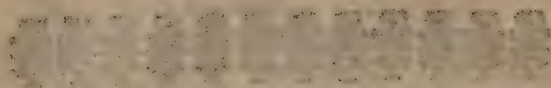
ERRATA.



ERRATA Sic Corrigenda.

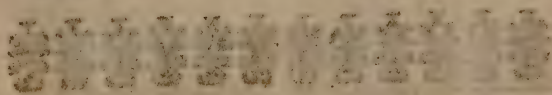
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ERRATA

The following are the errors which have crept into the text of the preceding volume, and which have been corrected in this edition. The errors are given in the order in which they occur in the text, and are numbered in the margin.





A Physick and Anatomical
Treatise of the Nature and
Office of the Pancreatick
Juyce.

Regnerus de Graaf, concerning the
Pancreatick Juyce.

C H A P. I.

*A Description of the Pancreas, before which
some things are put concerning the neces-
sity of Anatomy, and its Increase.*



T was never made a Question,
(unless perhaps by such through
whose ignorance True Phy-
sick is disgraced; or that can-
not distinguish the true Science
of Physick from the Emperical
curing of Diseases (that Ana-
tomy is very useful and necessary, as well for all
Phy-

Physitians as Chyrurgians; and that real Physick without it's Knowledge cannot stand, or be in force; which is wont to be called *Dogmatical* and *Rational*.

Seeing it is so, their Ingenuity and Study deserves Praise, who endeavour to arrive to a greater degree of Perfection in the Knowledge of *Anatomy*, by making a narrow search into the Secrets of Nature, and communicating those things which they have found out to others.

And amongst those who have given themselves up to this Work; neither frightened with it's difficulties, have had laudible success therein: *Gaspas Asekins* the Anatomist, comes not far behind, who, when he had met with the *Vena Lactea*, in the Year 1622. in a Dog which he undertook to open alive, he wholly gave himself to the further Discovery thereof; so that no Week passed without one or other Dissection; not only of Dogs, but other living Creatures also, as Cats, Lambs, Hogs, Cows, and also Horses, as you may see in that Book of his published after his Death. But dying young, he could not make a further progress in many other things, tending to this business exactly to explain them; and communicate them to the Learned World: Concerning their site and office, many Controversies, and Disputes have arisen amongst *Anatomists*; for they who imagined that all the Chyle ascended by the Meseraick Veins (in order to it's Sanguification by the Liver) did stiffly affirm, that these Milky Vessels

Chap. I. of the Pancreatick Juycce. 3

Vessels went to the Liver ; but others described their course another way.

And this matter remained in Doubt until the Year 1651. that the *Ductus Thoracicus* was found out by that most ingenious Anatomist, *John Pequet*, a French-Man, to which it is evident to all men, the Vessels discovered by *Asellius* do tend, and there lay down the humour, or matter by them contained.

And that we may not only speak of trifles, we cannot pass by with silence the famous Invention of the Bloods circulation by the incomparable *William Harvey*, chief Physitian to the King of *England*, discovered in the Year 1628. which although at the first found many Opposers, (to whom it seemed strange, that they being old, should lay aside their old Doctrines, and be taught anew what younger men did most certainly affirm) nevertheless, this Pillar of Truth remained unshaken against the most furious Assaults, and that so stedfastly, that not long after many Learned men were found, who considering the solid sayings of the Ancients, after this new Invention was found out, that it might be explained after a far better, and easier manner ; plainly made it appear by the writings of *Hippocrates*, that he understood this circular Motion of the Blood, to whom they judge there were nothing in the Art of Physick lay hid.

Yea, the matter is come so far, that you shall scarcely find any Physician of note, who doubts of the Bloods Circulation. So it re-

quires some time to disperse the mists of
mens contradicting any good, and new Inven-
tions.

Many famous men both in Judgment and Pra-
ctise, were stired up by the Examples of wor-
thy and excellent *Anatomists*, by whose Dili-
gence about the same time, viz. 1650. and 51.
in divers Countries it was discovered by *Olaus*
Rudbeckius, a Swede, and *Thomas Bartholinus*, a
Dane, both famous in *Anatomy*; that the *Lym-
phatick Vessels* were distributed through the
whole Body.

Also the *Ductus's* were observed in, or about
the Year 1655. (by *Thomas Wharton* an *English*
man) tending from the lower Maxillary Gland-
ule by a straight passage to the Nipples, which
are found also at the fleshy Ligature of the
Tongue, near the Teeth: Through which see-
ing the Salival Humidity continually floweth to
the Mouth for the moistning thereof, they are
called *Salivales*, and also *Inferiores*: To distin-
guish them from the superiour *Salival Ducts*,
which running from the upper Maxillary Gland-
ules, by a direct passage about the Cheek-
Muscle to the former part of the Mouth by the
region of the upper Eye-teeth, lay down their
Spittle.

Which Invention we owe to *Nicholas Stenonis*
a *Dane*, who discovered them in the Year 1661.
in his little Book for publick good. Also by his
Industry were found out many other Vessels pas-
sing into the Nostrils and Mouth. We follow-
ing his Example, some years since have obser-
ved,

Chap. 1. of the Pancreatick Juice. 5

ved, that the Gladulous part of the Jaw being prest, a thick and viscous Humour came forth by the general opening of the Pores; from which time we thought that that viscous Matter which appears by Spitting, or other compression of the Jaws, did in an especial manner proceed from those Ducts

Jo. George Wirsungus of Bavaria, is not silently to be passed by (who can call to mind all Inventions) who was very excellent in the Study of *Anatomy*; in the Year 1642. at *Padua*, first found out the *Ductus Pancreaticus*, which for the general good of Physicians, he caused to be Engraven in Copper, from whom we might have expected more, had he not been wickedly Pistol'd by envious persons in his own House. Seeing therefore this famous man could not so successively find out the Use of this Duct by his own Study, others, that they might be serviceable to the Physical Republick, persisted in the same Labour, and with so much the more Earnestness, in regard daily, there were more sharp Disputes concerning it's true Office, and that especially in the University of *Leyden* in *Holland*; the most famous and indefatigable *Franciscus de le Boe Sylvius* leading the way; who when he had understood the various Experiments which we had successfully made, by the dissecting of divers Kinds of Animals, very often, as well in private as in publick, advised us, that we would commit to Writing these things which we had observed worthy of Note concerning this matter.

We distrusting our own Industry, (and considering that there are found some (gluttons of Books, as they may be termed) who being stimulated with the desire of Vain Glory, spare not to assault all with their scribbling Pen, and scurrilous Language ;) were almost afraid to enter upon this work.

Yet considering that for the publick good, any thing was to be born with a Couragious mind ; we at last put a helping hand to this Labour, and withal, have polisht our Endeavours, which so took with this worthy man, that he more urged their publication than before ; as certain that we should have the favour of all Learned Men, for doing a thing of so great moment to the Publick Good : and often said, That we should not fear to publish these things which are clearly demonstrated to our Eyes.

We being perswaded by the Council of him, and other learned men, thought it worthy our Labour, the description of the Part being prefixt ; afterwards the Judgments, and Opinions of others being explained, concerning this Tuice, as we find it in every respect, to make it plain to all, and after to find out its true Use.

The lower part of the Belly being opened, & the Intestines, with the Venticle removed, the Pancreas or Sweet-bread presently appears; concerning which, as we shall find occasion to speak more, in the following pages, we will spend a little time in the exact Delineation thereof.

The Word Pancreas is Compounded of *Πα* and

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and *κέρας*, as if they would say that this viscous Part were all Flesh, which *Apellation*, notwithstanding is no way fit; but may be used as Money, to pass from one to another *Asellius* and some others of his Followers, particularly noting the middle-most glandule of the Mesentery, gave the first Occasion of understanding all its Parts, by one and the same name.

The *Substance* of the Pancreas (or Sweet-Bread, if you except its Membranes and Vessels), is wholly Glandulous; made up of many small Glandules; all which have so great a hardness, and Strength, that being separated from each other do still retain their proper form; and being put together, by reason of their loose joyning, make a soft Body: so that, not without Reason, they have called the Pancreas a loose and soft Glandule. Moreover, each Glandules, constituting the Pancreas, have their proper Membranes; and all being joyned together, are encompassed about with a Coat of sufficient Strength arising from the Peritonæum; by the benefit of which, they are strongly kept, with their little Vessels, in their own place.

Its *Scituation*, in a man, is under the hindmost part, of the Ventricle, about the uppermost Vertebra of the Loynes, where it is firmly connected to the Peritonæum. And it is extended from the Cavity of the Liver, *viz.* from the Entrance of the Venaporta, to the Region of the Spleen; by which means it is Transversely Scituated, and not exactly in the middle of the Body; seeing that the greatest part

thereof, is placed in the left Hypochondrium.

If you consider its *Colour*, it is pale, being altogether Glandulous; for the Blood gives little or no Colour to the Pancreas.

Its *Figure* is oblong, and broader, and thicker, towards the Intestinum Duodenum, and towards the Spleen narrower and thinner; nevertheless it is differently constituted in diverse Animals; for in Dogs, Cats, Apes, Ottars, and others of the like Nature, it is Bipartite: So that one part ascendeth towards the Stomach, and the other descendeth by the Membrane of the Mesenterium, (according to the passage of the Intestine) to the which, it is on every side firmly knit.

In Fishes and Fowls, for the most part it is long and single.

The *Magnitude* of the Pancreas in Healthful bodies is small, and compared with the other Bowels, comes short of most; yet in men of full growth, considered with the other Glandules it exceeds them all.

Its *Longitude* is usually eight or ten Fingers breadth, which it seldom exceeds in men of perfect health. Its *Latitude* is ordinarily two Fingers broad, or two and a half. Its *Thicknes*s, for as much as we could observe in dead Bodies by us Dissected, is a Fingers breadth. Finally, the weight is various, according to the diverse Magnitude of the Animal in which it exists: We have with the most curious VVharton, often observed it in Men to be four or five Ounces; and in Horses about eleven. The *Vessels* of the

Pan-

Chap. I. of the Pancreatick Juice. 9

Pancreas, by the most accurate Searchers of Nature, are referred only to four Kinds, viz. Arteries, Veins, Nerves, and it's own proper Ductus. The *Arteries* borrow their Original from the *Cæliaca*, the *Veins* from the *Ramus Splenicus*; the *Nerves* from the sixth pair of Nerves, and the *Ductus Pancreaticus* seems to be derived from the *Parenchyma* of the Pancreas. For as much as each Glandules constituting the Pancreas, send forth small Vessels, which meeting in the middle thereof, make up this large Ductus.

This Vessel which hath been before exposed to curious Eyes, in all appearance is Membranous; and although it be small, nevertheless it is sufficiently strong. It's bigness near the *Intestinum Duodenum*, is about the quantity of a small sized Quill, called a Pinion; but in it's progress towards the greater Lateral branches, and also to the lesser, running to all the Glandules of the Pancreas, it is divided, and gradually lessened; wherefore by how much the more it approacheth the Spleen, by so much it is the less, and sends forth smaller branches.

This Ductus, or passage for the most part, is wont in men to shew it's greatest branch in the lower part thereof, next to the *Intestinum Duodenum*, which hath more little branches than any other proceeding from the great Ductus, as appears by the following Table.

The

The Explication of the first Table.

AAA. The Ductus, or Trunk, of the new Vessel stretched forth according to the Longitude of the Pancreas.

BBB. The lateral Ducts, or small branches, arising on each side from the great Trunk, and dispersed into the substance of the Pancreas.

C. The Conjunction of the new Vessel with the Ductus Biliarius, or Choler-passage.

DD. The Cholar-passage freed from the Pancreas, by which it is hid.

E. The Common Ductus of the Pancreas and Cholar-passage, ending in the Intestinum Duodenum, about four Fingers breadth under the Pylorus.

FFF. The inner part of the Pancreas, admitting the Lateral branches.

G. Part of the Pancreas separated from the Ductus Biliarius, which it did cover.

HH. The inferiour part of the Ventricle drawn upwards.

I. The Pylorus.

K. The first of the small Gutts, which is called the Duodenum.

L. Part of the Duodenum lying under the Mesenterium.

MM. Part of the same Duodenum rising again in the left Hypochondrium.

NN. The Mesenterium freed from the Gutts.

O. The

Tab 1.

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- O. The Meseraick Vein.
- P. The meseraick Arterie.
- Q. The Ductus Cysticus.
- R. The Ductus Hepaticus.
- S. The Intestinum Duodenum opened.

We think it to be worth our while to examine that in many and different Animals, which belongs to the Insertion of the Ductus Pancreaticus; seeing that Nature oftentimes in one is more depressed and obscure, in another, more clearly manifested; so that none can truly determine concerning the Use, and Office of any part, which hath not diligently examined the Fabrick, and Scituation. the Vessels annexed, and other accidents in divers Animals.

For which Cause, we will briefly insert below the Differences, which we have observed in several kinds of living Creatures; as well that which belongs to the Ductus, as that which pertains to it's Insertion, that all may be able the better to judge of it's use. There are some Animals which have only one single Pancreatick Duct. Others there are which have it double, and lastly, some have three, when the Ductus is single; sometimes it enters with the Ductus Biliarius into the Intestinum Duodenum, and sometimes a part. When the Ductus is duplicate, sometimes one, sometimes both meet together with the Ductus Biliarius in the Intestine. But when the Ductus is threefold, sometimes one only, sometimes two, and sometimes
all

all three enter into the Intestine by the same passage, and also therein lay down a contained Humour. And if you consider the place of Insertion, it very much differs in divers living Creatures; for some are found in which the Ducts do disburden themselves into the Intestines, and also others in which they are discharged into the Ventricle.

The single Ductus for the most part is found in Man, Calves, Hogs, Hares, Conies, Cats, Dogs, Pikes, Carps, Eells, Barbils, &c. as we have formerly asserted; for in Men and Dogs we find it sometimes double, yet so as the second is less than the former, viz. then that which passeth into the Duodenum with the Ductus Biliarius.

As often as these two Ducts happen in the Animals but now cited, for the most part they are conjoynd in the Pancreas; so that the one being blown up, the other will swell; yet we find them so constituted in Man, that they are not joyned together, although both be extended to the extremity of the Pancreas almost in the same Longitude and Magnitude. A twofold Ductus is commonly found in Pheasants, Peacocks, Geese, Ducks, and other Animals, especially of the number of Fowls.

The threefold Ductus, for the most part is in Cocks, Hens, Pigeons and Magpyes, &c. When the Ductus Pancreaticus is single, it is commonly joyned with the Ductus Biliarius about it's Insertion into the Intestinum Duodenum, in Men and Fishes, as we have above declared;

Chap. I. of the Pancreatick Juyce. 13

as also in Cats, in which once we found by the side of the Gall-bladder, another little whitish Vessel towards which the Pancreas in an extraordinary manner extending it self, which being lightly compressed, there flowed a certain Matter into the Ductus Pancreaticus, like to the Juyce thereof, both in colour and substance: But the Bile in the same Cat retained both it's natural substance and colour, so that nothing seem'd to be changed which related to it's natural Constitution.

The Ductus Pancreaticus, and the Ductus Biliarius are not joyned together, but enter the Intestine in divers places in Hogs, Calves, Conies, and Hares, &c.

When the Ductus Pancreaticus is twofold, or threefold, sometimes only one of them is joyned with the Ductus Biliarius, as is evident in Pyes, and some other Birds. Sometimes two, as appears in Peacocks, Geese, Ducks, Pheasants; and Pigeons, in which now and then only one is joyned to the Ductus Biliarius: Sometimes all three being joyned therewith do pass into the Intestine, as we have sometimes observed in Hens.

Seeing we have already sufficiently spoken of it's Insertion into the Intestine, it also remains for us to speak something concerning the place of Insertion, as more nearly appertaining to our business. The *Pancreatick Juyce* doth immediately discharge it self into the Stomach in Barbils and Carps; but in other Creatures (for as much as we have observed) it dischargeth it

it self into the Intestines, and that in divers places; for in Men it is performed about four Fingers breadth, under the Pylorus, and in Birds about eight Fingers breadth, but in Hares and Conies, the breadth of fifteen or sixteen Fingers below the Pylorus.

Here we would diligently note, that as often as we name the Ductus Biliarius, we always thereby understand the Cysticus and Hepaticus; because these two are always joyned together about the end, only in Pigeons excepted, which want the Gall-bladder, and furthermore, are said to have no Gall; nevertheless, they have usually a threefold Ductus Biliarius, one of which enters immediately under the Pylorus, the other two make their entrance into the Intestine at a lower distance. Where those Ducts enter the Intestines or the Ventricle, the inner Tunicle of that part buncheth out, being wrinckled like a Navel; for which cause it more difficultly admits the Stile then the Ductus Biliarius, which is broader and not so lax.

There is no value found throughout the Ductus Pancreaticus, nor in it's Insertion to the Ductus Biliarius, as is rashly and fallly affirmed by some. And these few Observations may be sufficient as concerning the Systeme of the Pancreas; and no man ought to think, who hath observed so great a variety in it, and so many notable sports of Nature about it, that the Pancreas is slightly made; for the Liver, the Spleen, and several other Entrails of Animals,

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mals, also highly necessary, being different in themselves are found out by such, who diligently apply themselves to the Dissecting of sundry living Creatures; neither will they easily say it is unprofitable, who have observed it to be found in all kinds of Animals.

C H A P. II.

The Opinions of sundry Authors concerning the Office and Use of the Pancreas examined.

AS concerning the use of the Pancreas, it was not so much accounted of in former dayes as now it is; for *Hypocrates*, the reverend light and deity of some Physicians gave the Pancreas no Name, concerning which now a dayes, so many Opinions are seen in Authors: For some think it only to serve as a Pillow placed underneath the Ventricle, or Stomach, and for the distribution of the Vessels. Others that it received the Chyle from the Intestines; Others imagined that it purged the Excrement of the Chyle: Others that it were as the Bilarvesicle of the Spleen: Others, that the thicker and more unapt purgations of the Blood, were purged into it by the ordinary course of Nature: Others, that this part was made for the Reception of the Excrement of the Nerves. Finally,

Finally, others have publickly taught, that the Humour in the Pancreas was not only useful, but highly necessary to be understood.

The first Opinion may be ascribed to the Ancients, that this part is as a pillow under the Stomach, and serveth to distribute the Veins and Arteries; as *Vesalius*, the most ingenious *Anatomist* of his time sufficiently affirms, who broke forth into these words about the Fabrick of Mans body, *Lib. 8. cap. 4. De omento*. "This body in Man (speaking of the Pancreas) is more white than red, every where attended by the branches of the Vena porta, Arteries and Nerves, that their Complications may be the more firm, being only supported by the lower Membrane of the Omentum; that it may be placed under the Stomach like a prop, or pillow.

But this Opinion is no way probable; seeing then the Pancreas in Birds, Fishes, and many other living Creatures, in which it is otherwise situate then in Men would be useless; because in those it is in no wise found to be so placed under the Ventricle, neither doth it admit a passage to the Vessels, unless in a very few. But because the Ancients never had a true knowledge of the Glandules, we must not blame them for not delivering to us the true Use of the Pancreas.

The second Opinion is attributed to *Baccius* and *Folius*, both which sharply maintained, that the Chylus passeth from the Intestines to the Liver and Spleen, through the Ductus Pancreaticus:

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cus: The contrary of which is as clear as the Meridian Sun: Seeing that nothing is received from the Gutts into this Ductus, but only the Juyce sent forth by it self to the Intestines.

The third Opinion is ascribed to *Johā. Veslingius*; because in his Systeme of *Anatomy*, chap. 4. he thus speaketh of the Pancreas: "The use of this Ductus is not obscure, for seeing it hath acertain Juyce not much unlike to the Bile, it is manifest that such an Excrement is separated from the Chylus by a further Concoction, and being conveyed into this Vessel, is thence emitted into the Duodenum. *Asellius, Riolanus* and others favour this Opinion; but Experience contradicts it, and manifestly sheweth, that the Humour contained in the Pancreas is never really in it self bitter, and therefore in no wise to be compared with the Bile.

If at any time it happens that the Probe being put into this Ductus be yellow, every one will easily believe, that this is not occasioned by the Humour contained in the Pancreas, but from the Bile, as well flowing from the Ductus Cysticus, as the Hepaticus immediately into the Intestine; especially if he consider that the Stylus is spotted by the Bile, before it passeth from the Intestine to the Ductus Pancreaticus; and again, that it passeth through the Bile whilst it is drawn out: For the Ductus Pancreaticus, and the Ductus Biliarius in Men perforate the Intestine in the same place.

And although the most famous *D. Van Horne*, in a Bilious Diarrhæa saw that Vessel full of Choler, we say it was Preternatural, in as much as the Bile, which Copiously adhered to the end of the Ductus (as is wont to happen in a Diarrhæa) was thrown into the Cavity thereof, by the Agitation of that dead Body: Also that the excrement of the further Elaboration or Concoction of the Chylus, is not sent into this passage, is manifest, in regard the same is witnessed by Occular Inspection. In some Animals, that Glandulous Body doth not at all touch the Milky Vessels; and in others it only passeth over, and in no wise enters their Substance; as also because they are easily separated from the Pancreas, without the Effusion of any Chyle, as we have formerly demonstrated in Dogs, Cats, and other Animals.

Therefore we do not see upon what ground they might maintain the further Concoction of the Chylus to be celebrated in it, unless they following the Opinion of *Asellius*, would take this Glandulous body for the Middle Glandule of the Mesentery, into which the Venæ Lactææ are altogether immersed. The fourth Opinion is of *Bartholinus*, as is manifestly apparent from his Anatomy Chap. 13. *De Pancreate*; where he thinks the Bile to be purged Naturally by its Ductus, and will have it to be the Bilar-Vesicle or Gall-Bladder of the Spleen; so that the same use which the other affords to the Liver, he believes that this affords to the Spleen: Which Opinion (by the leave

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leave of so great a man) Anatomy in our Judgment seems to confute: Seeing the Ductus Pancreaticus passeth not to the Spleen; neither are there any other Vessels, which do convey any thing from the Spleen to it: For, there are found only two kinds of Vessels, which carry any thing back from the Spleen, viz. The Veines and Lymphatick Vessels: But the Veines carry back the Blood to the Liver, and the Complication of the Lymphaticks carrying from the Spleen, do not in like manner go to the Pancreas, but to the great Receptacle of the Chyle; so that nothing can be discharged out of the Spleen to the Pancreas; as our tryal in *France* hath sufficiently manifested, for their sakes, who judging this to be the best Opinion of most Authors, rejected ours. We tyed a Dog upon a Table, as is Demonstrated by the first Figure of the third Table; and when we had made a little Hole in the left Hypocondrium, with our two fore-Fingers we pull'd out the Spleen, whose Bloody Vessels we tyed with two or three several Ligatures, and afterwards we cut the same in sunder between the Spleen and the Bonds; and when we had quite taken away the Spleen, we drew together the Lips of the Wound with small threds in three or four several places, whereby this Dog, in a short time, being well cured, was returned to us, (at which we did not at all wonder, because we once had a Bitch, which brought forth three or four Puppies after the Extirpation of her Spleen); and two

C 2 Months

Mouths after the loss of the Spleen in the same Dog, we collected a notable quantity of the Pancreatick Juice, which the Professors of *Andegave*, the Doctors of *Virecht*, *D. Haverloo*, and *D. de Maets*, judged to be acidly Salt: which being true, none as we think free from Prejudice, will maintain that the *Succus Pancreaticus* proceeds from the Spleen.

Also, it is worthy to be noted, That those Dogs did no less greedily desire, or better digest, their Food after the Extirpation of the Spleen, than before; from whence we, receding from the Common Opinion, judge that no Fermentitious Matter or Humour is sent from the Spleen to the Stomach.

The Fifth Opinion is attributed to the most Famous *Lindanus*, seeing that in his *Medic. Physiol.* c. 5. Art. 5. pag. 114. he saith, *When I consider what appertains to the Use, besides the structure of the Pancreas; how many Diseases Practise takes notice of in it, I cannot doubt but that the thicker, and more useless Purgations of the Blood, are thrown out into it, by the Ordinary Law of Nature; so as they may be corrected by the Spleen: and also by an Extraordinary: all the Melancholy which either an Intemperate Diet, or Disease hath bred. The Ductus it self gives us cause to believe, That they are both carried to the Intestines; and Curation teacheth the same by the Medicines often required. And this Opinion seems also to us to be contrary to the Truth, seeing that the Pancreatick Juice, as often as it hath been truly collected by us, always appeared Limpid like Wine.* But

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But what we shall say concerning the Excrementitious Humour, will sufficiently appear by the following Article, and also by those things which shall be spoken of presently after. The Sixth Opinion is manifest enough from Wharton's Treatise of the Glandules, Chap. XIII. whilst he writes. *Therefore I think that this Glandule (as likewise all others) do minister to the Nerves, and that it receives some of the Superfluities of the Nerves, of the sixth Paire, with the little Branches of the Spinal Marrow, in the greater folding of the Unitings; and by its own Proper Vessel carries it to the Intestines.*

But seeing that the Nerves are designed to carry Animal Spirits, we do not understand upon what ground the industrious Anatomist will hold, that the Excrementitious humour is carryed through them, and wherefore he will affirm that it is rather carryed into the Pancreas than into the Spleen, or other parts of the Body, to which Nerves of the same Original do belong.

Truly the Pancreas is too far from the Brain to receive its Excrement; moreover, the Nerves abhor all acrimony, so as to receive any sharper Juice: For which cause, we judge this Opinion to stand upon too slight a Foundation to be admitted for Truth; and so much the less, seeing we could never perceive any Cavity or Liquour in the Nerves, notwithstanding all the diligence we could use to this purpose, the most accurate Microscopes have been of no use to us, for the discovery of the

least pores in them: We do not here speak of the distances which are like Pores, seen between the small Conveyances of the Nerves; but of the Cavity it self, of the little Pipes, by which these Excrements ought to pass. Furthermore, it is proved by Ligatures that no remarkable quantity of Humour is carryed by the Nerves, in which there is not the least Swelling, of either side: the Ligature which we have observed, nor yet by any other that we read of.

That which Chyrurgions cry out of the dropping of the Nerves, we rather ascribe to the hurt of the Lymphatick Vessels, being nigh to the Nerves, than the hurt of the Nerves themselves; for which reason, that we might have a more certain information, we have sometimes in Dogs, laid bare that notable Nerve in the hinder-most part of the Legs, and cut it cross through the middle, and have put it into a Vial, being freed from the Lymphatick Vessels (as we use to do in collecting of the Pancreatick Juice), the neck of which was so straightened for this purpose, as that the Nerves being cut asunder, the Orifice might be well closed by its thickness, that Spirits, or whatsoever subtil Matter passeth through the Nerves, might not vanish into the Aire. We fixed this Vial to the skin with the Nerve hanging down into its Hollownes, hoping that if any Liquor did pass through the Nerves, we should by that means attain it, but in vain: For, in the space of four or five hours, we got

not

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not the least drop; nor did we observe that the Animal Spirits did adhere by Condensation to the sides of the Glass

Such Birds are to be caught with more subtiler nets; which after they are taken, we will prepare to break-fast withal. Seeing therefore little or no visible matter is carried through the Nerves, we pray the Propugners of this Opinion to tell us, Why Nature in the Pancreas (as they will have it) hath only formed a Ductus to receive the Excrements of the Nerves, which sometimes exceed in Magnitude the Recurrent Nerves themselves, whose small Branches often touch the Pancreas. What appertains to the word Excrement, whereby they point out our Juice, we think it not convenient for it, if they understand whatsoever is separated from the Blood, whether good or evil; but it is in no respect agreeable to the Pancreatick Juice, if by the word Excrement they understand whatsoever is carryed from the Blood to be unprofitable, for Reasons hereafter to be declared.

The Seventh Opinion is assigned to the most Famous *Franciscus de la Boesylvius*; who thinks nothing is carryed from the Intestines to the Pancreas, by this Ductus; nor any secret unprofitable Excrement by the same to the Intestines; but a commendable Humour prepared therein of Blood, and Animal Spirits; and so conveyed to the Intestine, and permixed with the Aliment.

And in regard he knew that nothing was carryed to the Intestines, but what was first swallowed into the Stomach, and by that driven out again through the Pylorus, or is sent through the Bilar, or Pancreatick Ductus; and he moreover considering, not only in intermitting Feavours, that the sick were alwayes troubled with various pains in their Loynes, by Cold, Heat, Yawnings, Reachings, and Vomittings, as well of insipid Phlegm, and sometimes acid, as of Choler; sometimes bitter, sometimes acid and bitter, &c. but also in other diseases proceeding from hence to the Hypochondriack Affection. As for example, in the Scurvey, the Disease called the Suffocation of the Womb, the *Chollerico Passio*, pains of the Belly, and consequently from hence in the Ulcerated Mouths, or Thrushes of Children, &c. Belchings, and Acid Humours do arise, he concluded (although he never saw the Pancreatick Juice, as he ingenuously confesseth, *Thef.* 37. of the use of the Spleen and Glandules) that the Pancreatick Juice, in its own Nature was Subacid, in an especial manner tempered by the animal Spirits.

For, he judged that the Bile which is bitter and contrary to Acidity, could not be the cause of an acid Humour; and therefore he determines that Spittle, alwayes insipid in sound men; and oftentimes so acid, and remarkably sharp in the sick, came not from the Pancreatick Juice.

And

Chap. 2. *of the Pancreatick Juycce.* 25

And because we heard that most Learned man often teaching these and the like things, and did see the same confirm'd by a happy practise in the Hospital; his opinion so pleased us, that we never frequented his Meetings, whether publick or private, without great satisfaction of mind; in which, being excited to find out the further truth of the matter, by the same worthy person and his Disciples, we have undertook the work; and although we could not once despair of a happy success; in process of time, God favouring our Enterprize and Desires, in the Year 1662. found out the way of Collecting the Pancreatick Juice; which, by way of History, as it shall conveniently occur in the Work, we will set down: In which our Thoughts shipwrackt themselves from those scruples, by which they may be cautioned, who will follow our foot-steps to examine it.

CHAP.

CHAP. III.

*In what manner the Pancreatick Juice
was found out.*

THE First Experiment by which we undertook to collect the Pancreatick Juice in a living Dog, was a Ligature with which we tied the upper-part of the Pancreas, together with the thin Gut; for, by that means, we hoped that after some Hours we should have found the Pancreatick Duct swell'd with Juice, but in vain: which seemed to our Judgment to happen by reason that the Motion of the Blood being hindered to the Pancreas, the separation of the Juice from it was prevented also.

The Second Experiment was also by a Ligature made about the Insertion of the Ductus into the Intestinum Duodenum, but also in vain. The Reason perhaps was the Glandules of the Pancreas being hurt, by whose Ductus all the Pancreatick Juice might the more easilier have flown out, by reason that neither in the great Ductus nor in the lateral branches is there any valves found.

The Third Experiment was by two boards or planks, higher in the middle, than at the ends, applied and straightly bound to the Duodenum,

P.3.
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num, at the ingress of the Pancreatick Ductus; from whence, after some hours, the Abdomen being opened again, which before had been lightly itched up, we found the Pancreatick Ductus swelled with a clear and limpid Juice; nevertheless, we could not conveniently either take it out, or tast it. By which success we being animated the more, resolved a fourth Tryal, by opening the Intestinum Duodenum, according to the Longitude thereof; and presently applying a little vessel to the Orifice of the Ductus Pancreaticus, as the first Figure of the following Table A. demonstrates; afterwards by straightly tying the said Intestine about the neck of the vessel: so that its Orifice was diametrically opposite to the end of the Ductus Pancreaticus, not doubting but by this means we should gather a rare quantity of the Pancreatick Juice; but this also in vain: without doubt, because the air included within the vessel, denied entrance to the Pancreatick Juice, lightly touching it. Therefore we resolved to try a Fifth Experiment, with a little vessel finally perforated, as the first Figure of the Second Table shews under the letter B. By which advantage, in the space of five hours, we collected so great a quantity of Liquor, that the vessel was almost half full; whose contained Liquor was of a bitter relish, and of a yellowish colour; which we judged to happen, because the bile, (by reason the Intestine was not first cleansed) was intermixed with the Succus Pancreaticus. Wherefore, after many
and

and tiresome vexations of mind, we came to a Sixth Experiment; which seeing it in all respects sufficiently answered our Expectations; here we will add its exact description for the sake of the Curious, that they may give credit to their proper senses, which in others words most easily lessen the Credit.

A little Vessel, with a longer neck, was taken, as the II. Table under the letter *A.* represents; in the upper part of whose Belly a little hole was pierced *B.*; by which the air included in it, gave way to the Pancreatick Juice.

Let the neck of the Vessel be encompassed with a little cord *C.*; and severall Rings of Iron, thereunto affixed, or any other convenient thing; by the advantage of which, the Intestine may the more easily be stretched up.

Furthermore, you must take a wild Ducks quill *D.* because that kind of bird hath longer and thinner than all others, which must be so involved about the larger part thereof with Paper, a little besmeared with boiled Starch, that the Orifice of the vessel *H.* whilst it is included in it, may be most exactly closed: lest either the Bile or Blood, penetrating by the sides of the quill, defile the Juice collected, or to be collected in the Vessel.

This quill is affixed to the Vessel, by reason of the straightness of the Pancreatick Duct, which will not admit the neck of the Vessel. Presently you must take a little tap or stopple

Chap. 3. *of the Pancreatick Juyce.* 29

ple made of soft Wood, and of such thickness that it may fill up the narrower Orifice *G.* which with the Alligated thred *K.* by the help of the Style may be so far protruded through the larger part of the quill *F.* that a little thereof may remain in the larger part of the quill *G.* and there may stick so fast, that it may not return of its own accord into the Ductus Pancreaticus; because then the Pituitous or Vermiculous cruſted matter, of the Intestines, continually adhering about the end of the Ductus being moved, would easily cause it to be obstructed; which need not be feared, if the stopple remain in the quill.

But the Tap is not so strongly to be forced into the Quill, but that by the help of the thred it may easily be retracted. You have all these things set forth in the Second Figure of the Second Table.

The Explication of the Second Table.

Fig. I. Sheweth all things necessary for the preparing of the Vessel.

A. The Glass Vessel. *B.* A small hole in the upper part of the Vessel.

C. A little String adorned with Iron Rings.
D. A long and slender Quill of a Wild Duck.

E. The Paper with which the Quill is wrapped

enwrapped. *F.* The larger part of the Quill.

G. the more slender part of the Quill. *H.* The Mouth of the Glass Vessel.

I. The wooden Tap or Stopple. *K.* The thread annexed to the Tap.

Fig. II. Doth exhibit the Vessel as it ought to be furnished with all its Requisites.

Fig. III. Denotes the parts of the Instrument, by which the lower end of the Ductus Pancreaticus may be closed.

A A. Two Tables made of Ivory. *B B B B.* Four little Holes made in the ends of the Tables.

C C. Two Cylinders. *D D.* Two Scrues turn'd about the Cylinders.

All the Instruments aforesaid being prepared and fitted, a Dog to is be taken; to whom, for the space of some hours, no food hath been given: But, a young Mastive is to be preferred; because he, of all other Dogs, of the same Magnitude, hath larger Bowels, and by reason of the Humidity predominating in him, yeildeth more Pancreatick Juice, and also longer Life, and moreover less trouble in dissecting. We say that a fasting Dog is to be taken, lest that the Intestines, with the Ventricle waxing bigger by aliment, the Closure of the Abdomen, after the Application of the Glass, be impeded; or also, the mouth of the Quill, by the two much Compression of the Bowels, be shut up.

Having

Tab II

Fig.

Place this after Fol: 30.

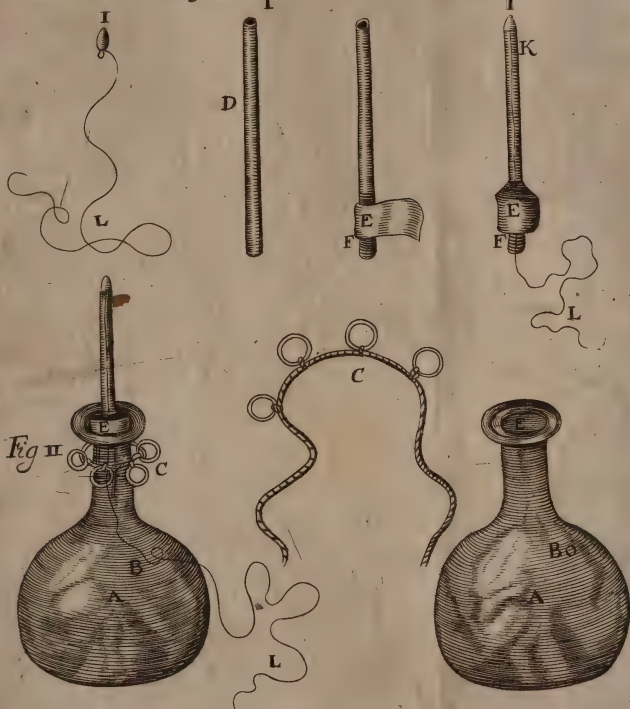
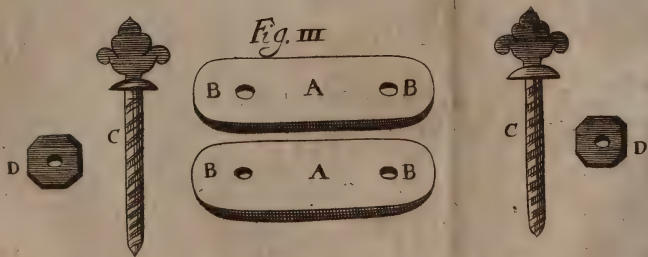
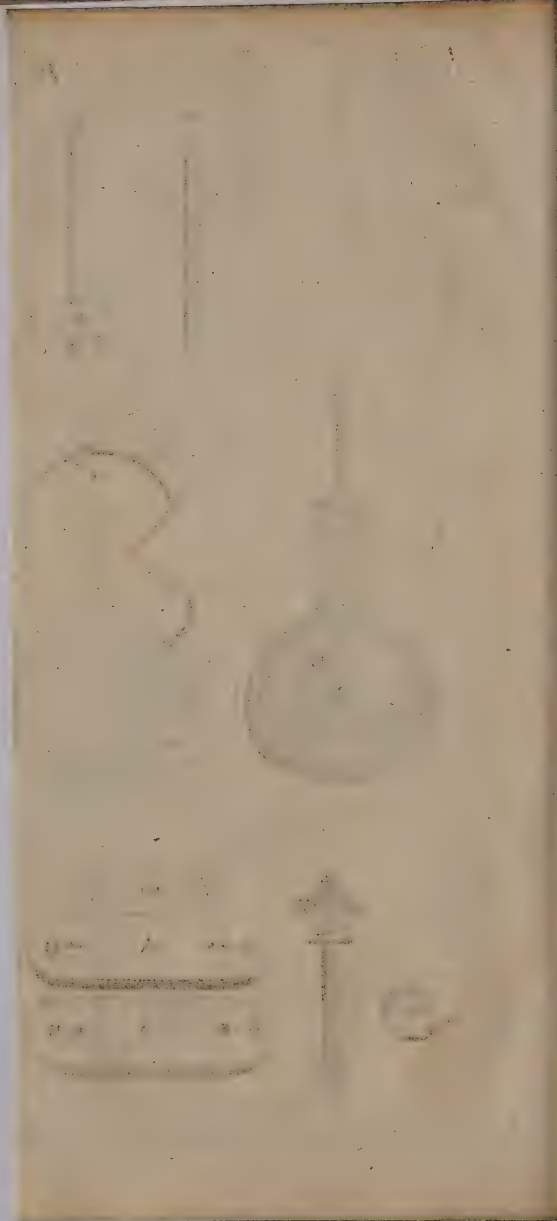


Fig. III





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Chap.3. *of the Pancreatick Juycce.* 31

Having got such a Dog, after his Mouth is strictly bound that he may not bite; and having tyed his extended Legs, upon a Table, let the Style be thrust under the Larynx, the long Muscles being first removed, bending his neck; which done, let there be made a little hole in that part thereof, which is most prominent, by cutting the Particles of the two Cartilages; that by the same Hole, his troublesome cry, to the standers by, being removed, a Respiration be procured. In such sort as is shewed, *Tab. III. Fig. I.* These things premized, you must open the Abdomen with one incision, according to the White line from the sword like Cartilage, unto the Region of the Pubes; then presently draw the Gut through the Wound, and make a Ligature about it three or four fingers breadth below the Pylorus, as also under the end of the Ductus Pancreaticus, lest the Aliments sliding from the Ventricle, or those things contained in the Guts, by their Peristaltick Motion, against things thrust forward, should disturb or hinder this our VVork.

Then between both Ligatures, let the Intestine be cut open in its Anteriour Part, being first freed from the Mesentery; by and by the Bile, with the Phleme, and other matter found therein, being cleansed away by a Sponge, the Ductus Pancreaticus may be observed; the which, with almost two Fingers breadth beneath the end of the Ductus Biliarius, and well nigh the same space above the Connexion of
the

the Intestine, with the descending part of the Pancreas, into Ductus of the narrower Orifice is gently to be inmitted, the end of the Quill shut up with its Spour or stopper, with the Glass vessel on the other part fastned to it; which, by the mediation of the little Cord, containing the Rings C. it is sewed to the Intestine with a double thred; so that, the extremity of the quill G. may remain in the Ductus Pancreaticus; nor the Vessel recede from the Intestine. VVhich things rightly performed, the Abdomen is to be sewed together with a thick thred, that the Vessel may hang forth without the Cavity thereof, as is to be seen *Fig. II. Tab. III.* To which, now part of an Exsiccated Bladder N. is to be so bound with a string about the neck of the Vessel, that it may on every side cover the Vessel; lest the blood or bile flowing by the hole of the Vessel B. might enter into it. These things so done, the Tap or Stopple I. by the help of the thred K. is to be drawn through the hole B. This Instrument will alwayes be sufficient where the Ductus Pancreaticus hath only one passage into the Intestine; but if besides this ordinary Ductus, there be yet another passage, as in like manner we have sometimes found; there is another Instrument required, by which that also may be closed. The which Instrument in the end we thought upon, as being more agreeable to this matter, then that of which we have already discoursed in the third Experiment, and it is noted; *Tab. II. Fig. III.*

It

Chap. 3. *Of the Pancreatick Juice.* 33

It hath two Tables made of Ivory *AA* in the extremity of which are four holes *BBBB*. These Tables may be so applyed between the Ventricle and the Vessel, affixed to both sides of the Intestine; and the intermediate Intestine may be somewhat compressed with the hand, till the acute Style, and the Clynders *CC*. be transmitted through the holes, and through the Scrues *DD*.

The intermediate Intestine may be so straightned, that nothing from these Secondary Ducts (which we have alwayes found to be present in the Superiour place) may flow out; by which means all the Juice flowing through that Ductus, in which the Quill is immitted may be received by the affixed Vessel.

The Explication of the Third Table.

Fig. I. Exhibiteth a Dog, in which is shewed the manner how, and place where, the Instruments noted *Tab. II.* are to be affixed.

A. The Glass Viall. *B.* The Needle. *M.* The Pylorus. *N.* The Intestinum Duodenum.

O. the Pancreas. *P.* The Presse. *Q.* The little Hole cut in the Larynx.

Fig. II. Represents a Dog, whose Abdomen, after the Application of the instruments is sewed together.

D

AA

AA. Two Glass Vials to collect the Succus Pancreaticus, and the Spittle.

N. A part of the Bladder, where-with the Glass is covered, lest the Blood entring through the hole thereof should defile the Pancreatick Juice.

CHAP. IV.

In which the Qualities of the Pancreatick Juice are described: By a plain Division of the Glandules of the whole Body, is shown that the Succus Pancreaticus is not Excrementitious: Also, How it is Generated.

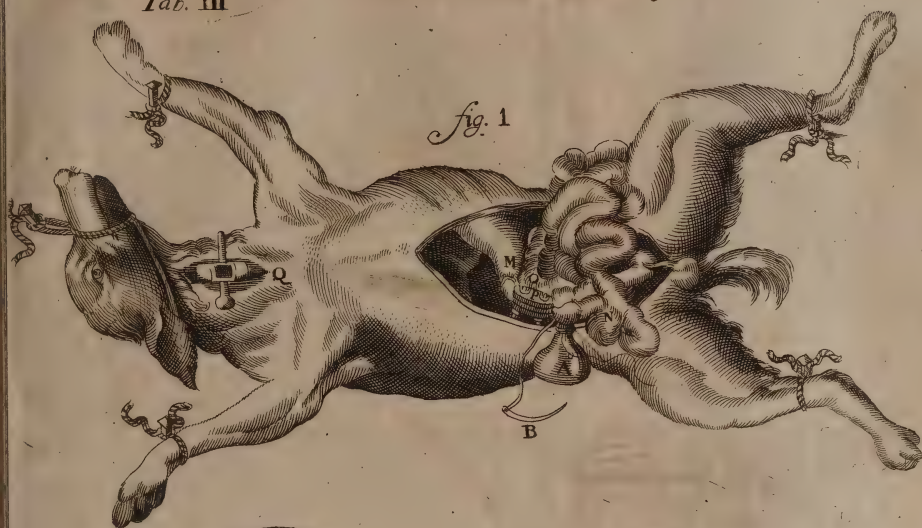
HAVING related the Instruments with their manner of applying, there is none but may see that we may easily come to a more intimate knowledge of the Pancreatick Juice, by observing not only the qualities thereof, but also the Quantity which at all hours do flow to the Intestinum Duodenum.

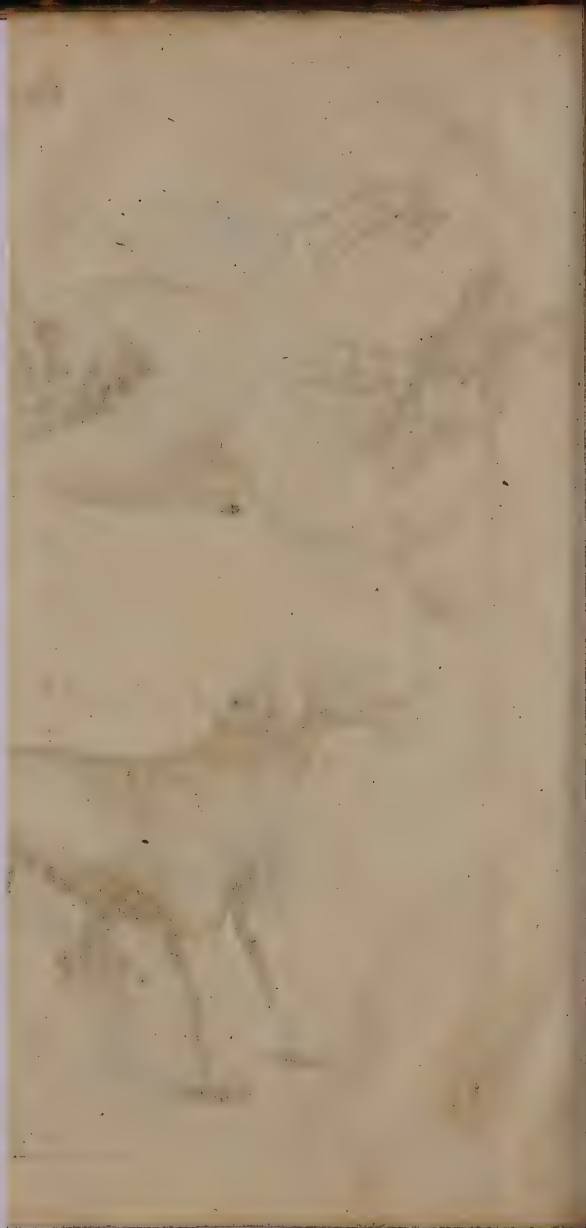
The Qualities of the Pancreatick Juice so collected, both Visible and Tactable, such as we have frequently observed them, we shall here set down for the sake of those who desire to be informed:

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Tab. III

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Chap. 4. of the Pancreatick Juycce. 35

As often as we have rightly collected the Pancreatick Juice, we have found it like clear Fountain Water, with some-thing of Viscidity, but not without the associating of Dissipated Spirits. The Qualities thereof are perceptible to the tast; not alwayes in the same manner in themselves, which denote those Functions depending upon it, not seldome to be vitiated, and the same is evinced by our Experience; For, we sometimes have found it most gratefully acid, sometimes almost insipid, sometimes austere, often times salt, but most often acidly salt.

Of this our Experience, we cite an approved Witness, the most excellent *D. Vander Sprongh*, with the most famous Professor *Sylvius*, as also many others who have sometimes been Fellowes of our practical Colledge, who in their presence judged with us, that in such a Collection it were both of an austere, and acidly Salt Sapor.

The notable Effect of the Austerity thereof, then also observed, we will hereafter declare. Now having found out the Pancreatick Juice, that we may clearly and distinctly subject the Generation thereof to your Eyes, we will propose a description of all the Glandules, by distinguishing them with the Famous *D. Sylvius* into Conglobated and Conglomerated. We call them conglobated, which are Constituted, as it were, from one continued Substance, having an equal Superifices; such as in the Mesentery, Neck, Shares, and other parts of the Body, many are found.

But we call those Conglomerated, which rise from many lesser Glandules joyn'd together; such are the Pancreas, Salival Ducts, and many others in the Fauces, Nostriis; yea they constitute the Thyme it self, or Glandule, under the Channel bone, concerning which we are willing here to say somewhat of what we have some years since observed, whilst we were Conversant about the dissecting of Calves (in which this Glandule was found very great, and that which is most worthy of note, no less in Calves, than in other Animals, That it is sensibly diminished after the Birth) that this notable Ductus was found repleat with a Limpid humor, which we sometime prosecuted; but because, upon the laying open thereof, the Liquor did continually Flow out, the intire Ductus vanished away before we could enter its end: For which reason, we were constrained to defer its further Enquiry till another occasion.

That this Distinction of the Glandules is not Fained but Real, the following Experiment doth prove. As well the Conglomerated as the Conglobated are cloathed with a Coat or Membrane; which being taken away, and a certain Liquor immitted, as well through the Ductus Pancreaticus, as through the Salivales; also by the Arteries of all the Glandules, by the help of a Syringe with divers little pipes fastned to the same, contrived by us, and proposed in our Treatise concerning the Organs of men, as subservient to many things

things in Generation; and there will be observed by a most Elegant Spectacle Conglomerated Glandules, receding or parting by course from themselves; especially if from hence the little Membranes, whereby they are connexed, be cut with a Knife: Which, in no wise, is to be expected from the Conglobated Glandules, notwithstanding the greatest diligence:

Besides the Glandules differ among themselves, in relation to their Substance: Because in the ordinary course of Nature, we have found a Cavity in the middle of the Conglobated Glandules; but not in the Conglomerated; which, by that great Expounder of Nature, and by an indissoluble bond of Friendship endeared to us, *Nicholas Stenon*, we have seen noted, and observed; who in his Anatomical Observations concerning the Conglobated Glandules, saith:

For, outwardly the Conglobated Glandules are hollow not inwardly like a Basen, yet if you rightly enter the Separation between the protuberating Lips on every side, you shall find as it were a Cleft or Chap, by which go forth certain Lymphatick Roots returning with the Membrane.

Their Substances differ not only among themselves by way of Connexion, as they are Conglobated and Conglomerated, but also in the peculiar Vessels; for, the Conglobated are given to the Lymphatick Vessels, which towards, and at the Common Ductus Thoracicus; or the Superior Folding thereof, especi-

ally Conspicuous in Dogs, drive out a Liquor prepared in themselves, or received from another. But the Conglomerated dispose their Liquour into peculiar Cavities, as the Salivales into the Mouth, the Pancreas into the Duodenum, and so of others.

That the Motion of the Lympha is such, as we have even now asserted, and not from the Centre to the Circumference, is proved by the Values in the Lymphatick Vessels, every-where existing, as may be seen in a little Treatise, concerning the Values of the Lymphatick Vessels, by the most Famous, and our entire Friend, Dr. *Ruyfch*, Anatomyst of *Amsterdam*; Printed *Anno 1665*. by whose Indefatigable Dilligence, at the same time, was discovered that Vessel which he calleth the Bronchial Artery, by reason that it accompanyeth the Widenings of the Branches of the sharp Artery through the whole Substance of the Lungs; as may be seen by the Figure thereof, inserted into his little Book, aforementioned; and worthily Communicated to us.

Seeing that the Duct's, and also the Substances of the Glandules are diverse, it is worthy our enquiry, Whether the Humour, observed in all the Glandules, be of the same, or a different Quality? But we shall answer, That the same, or like Humour is separated in all the Glandules, of a diverse Species; for one Liquor is deposted in the Conglobated, and another in the Conglomerated: For, that which is separated in the Conglobated is all of the same Nature:

Chap 4. of the Pancreatick Juycce. 39

Nature: which is proved, not only by the Substance of the same Glandules, every where Consimilar, but also by the wayes by which they are all distburdened; for as much, as further appears to us, ending in the Ductus Thoracicus. Moreover, it is further Demonstrable, by the Liquor of the Conglobated Glandules, ordinarily found more Saltish, and less Acid in them, than in the Conglomerated Glandules of the Pancreas; nevertheless more of Acidity, and Saltitude, than that of the Conglomerated Salivales. From whence it is manifest, that a Liquor is separated from the Conglomerated Glandules of the Salivales, and Pancreas not alike in all its Qualities, as we have asserted even now to be done in the Conglobated; in which matter, that we might be more certain, at the same time, and to the same Animal, we applied the Instrument depicted *Tab. II. Fig. II.* both to the Ductus Pancreaticus, and to the upper Salivary Duct, as is exhibited *Tab. III. Fig. II.* But we found a notable diversity of the aforesaid Liquors; For, the Salival is either Temperate or Insipid; but the Succus Pancreaticus is acidly Salt, or such like, for the most part, as we have described it in the former Chapter.

Seeing there is a diverse Juice of diverse Glandules, it deserves our enquiry, What use every one may have, and whether it be profitable or unnecessary? That is, Whether it bringeth any Commodity to the Body? Or, Whether it be such as is in no wise Subservi-

ent to the Oeconomy of the Humane Fabrick ? It will not be hard to satisfie this difficulty, especially if we make a more exact Scrutiny into the Motion of those Liquors ; for seeing that all the Liquor of the Conglobated Glandules, is inserted into the Ductus Thoracicus, and there permixed with the Chyle, the chief part of Aliments, and with the same may proceed, and be purged into the Jugular Veine, or left Subclavian Vessel ; from whence, being confused with the descending Blood, necessarily passeth through the right Ear of the Heart, into its right Ventricle. We do not see by what name it may be called Excrementitious and unprofitable ; because the Excrementitious Humours are separated from the Blood : so that, according to the Order of Nature, they may not any more be commixed therewith ; but are wholly separated from the Body ; which is clearly seen in the Urine ; the which, being separated from the masse of Blood in the Reines, and thence deduced through the Ureters into the Bladder : from whence, after some stay, according to the Dictate of the Will, by the Urinary passage it is excluded from the Body ; so that it can never again return.

So, the Juice of the Conglomerated Glandules, is effused through particular Ducts, into divers Cavities of the Body, where it may be mingled with other Humours necessary for Nourishment, and is least of all to be esteemed for Excrementitious, or Unprofitable. Which that it may likewise, be made known, in like manner,

Chap.4. of the Pancreatick Juyce. 41

manner, as we have prosecuted the Liquor of the Conglobated Glandules; so also, we shall follow that of the Conglomerated flowing from the Salivales, and the Pancreas.

The Spittle is separated from the Blood, in the Maxillary Glandules, as well the Superiour as the Inferiour, and is carryed by the said Salival Ducts, into the Cavity of the Mouth; where it may be mixed with the assumed Aliment, or out of the time of the Aliments Assumption, is continually swallowed; the which we never better consider, than whilst we hold something in our Mouth; the which, because of the cleanness of the place, in which we are, we will not spit out, neither dare we swallow it down; for the Mouth is very quickly fill'd with Spittle.

Therefore the Spittle, although without our knowledge, is continually swallowed, and mingled, and confused in the stomach with the Aliment, which truly would be very indecent, if the same were unprofitable and excrementitious.

The Pancreatick Juice is effused in the glandules of the pancreas, after the same manner as the Spittle in the salivales, being continually separated in a Man about the breadth of four fingers under the Pylorus into the *intestinum duodenum*, and there is mixed with the Aliments already passed the fermentation of the stomach, and with the same is driven downwards by the peristaltick motion of the Guts: in which propulsion the greatest part thereof, together with the more pure and liquid

liquid part of the Aliment is carried to the *vena Lactea*, and thence to the Cistern; from thence it penetrates through the *Ductus Thoracicus* to the subclavian Vein, and so forward to the right Ventricle of the Heart; which indeed would happen against reason, if the said humours were Excrementitious, and unprofitable to the œconomy of the body of Man.

To this Opinion, besides *Sylvius*, agrees *Godofridus Mæbius*, who in his Physiological foundations of Medicine, c. 12. concerning the use of the Intestines, thus speaketh: "But this Juice (namely the Pancreatick) seeing that it may be admixed with the Chyle, together with the Bile in the Duodenum, without all doubt it further helps and promotes its Fermentation: For, if the pure purged Excrement should be of no use, Nature would have derived that Channel to the lower Intestines, wherein hard and unprofitable Excrements are lodged, not to the Superiour, where the Chyle begun in the Stomach, ought to be perfected.

Seeing than that by Reasons and Experiments, already sufficiently inferd, it is manifest, That the Humours, as well of the Conglobated, as the Conglomerated Glandules, are not Excrementitious. We think fit, before we proceed any further, to propose their Way or Mode of Generation.

It hath been, in times past, believed by the Antients, (to say nothing concerning Faulties, and other their Figments) that the Glandules

Chap. 4. *of the Pancreatick Juice.* 43.

did imbile Superfluous Humidities, like unto Sponges. But to the Neotericks, it seemed after a more attentive Examination of their Structure, that this Simillitude was greatly wide of the Truth; by reason the Glandules are not every where open to the Pores, but are sufficiently cloathed on all sides with a strong Membrane; & therefore they think that nothing entreth into the Glandules, unless it be thither propelled by the Arteries and Nerves.

But the Arteries carry the Humours of every kind to the Glandules, under the Colour of Blood; every of which, by reason of a certain Disposition of the Pores, even as Seives do admit such Particles of the Humours, which in respect of their Magnitude, and Figure, have the greatest Analogy, with the little Pores; in the mean while excluding others, which have with them a lesser Simillitude; which therefore by the name of Blood, are constrained to return to the Heart; from whence, being more exalted in their passage, they are presently driven indiscriminately, by the Pulsifick force thereof, to the Glandules, and other parts of the Body; but, notwithstanding the Particles fitted to the Generation of the Pancreatick Juice, are no where more easily separated than in the Pancreas, no where more serous than in the Reins, no where more commodiously Bilious than in the Liver; & so of the rest: Because there are some parts of the Body which do more commodiously receive this or that Humour into the Pores than others.

Nature

Nature hath therefore invented a singular Artifice, whereby it doth so happily absolve so diverse a work, in diverse parts of Animals; which they do less admire, who diligently consider with themselves, that the like thing doth necessarily happen in Plants: For, we see various Plants, posited in the same Sand, each to admit a peculiar Juice; which, nevertheless, is so Homo-geneous, that it may contain in it self diverse Particles, as we see in Trees, whereon, by the Industry of Gardeners, divers Fruits do grow; whereas also divers Branches or Twigs are grafted into the same Stock; which, by reason of the different Constitution of their Pores, they admit this, and not that part of the Liquor or Sap, others being excluded, which have a lesser Affinity with their Pores.

The which things being equally granted, we may inferre, that the matter fitted to the generation of the Pancreatick Juice, is separated from the Blood by a certain disposition of the Pancreas; yet not so exactly, but that it may bring divers other Particles with it; as ocular Inspection doth ascertain us to happen in the Reins; in which indeed primarily the more Serous Particles of the blood, after the manner of Transcolation, are separated from its intire Masse; yet, nevertheless, we note those many Saline, Bilious, and other Humours; which are, as it were, snatcht away therewith, by reason of them or those Particles largely abounding in the Body; in like manner as Chymistry

Chap.4. of the Pancreatick Juyce. 45

mistry doth Demonstrate all these things to our Eyes, as clear as the Meridian Light.

The Animal Spirits joyne themselves to the Succus Pancreaticus by a continual Circulation, continually separated from the Blood, with which, being joyn'd together by an Amicable Connexion, they run into the Intestinum Duodenum. From whence it is Conspicuous, that our Pancreatick Juice is not simple, but compounded of divers; this especially, Acid, Aqueous, Saline, and other Particles therein found, adjoynd to the Animal Spirits; by whose Volatile Sweetness the force of Acids is restrained; whence it happens, that the Pancreatick Juice is Naturally Acidly-Temperate.

Some may say, after what manner may the Pancreatick Juice be Acidly Temperate, seeing that in the Precedent Chapter we have said, that it is very often Acidly-salt, and naturally may be said to be such as alwayes, or for the most part, it happeneth to be? But, we shall Answer, That perhaps it so happeneth in Dogs onely; because they ought to digest Bones, and other things of a harder Concoction, but in Men we judge there is no such Salitudo existant or required; Because, in Men, that which is Vomited, is either Insipid, or Bitter, or Acid, very rarely, and perhaps never Acidly Salt; the which undoubtedly would happen if

if their Pancreatick Juice were Naturally such.

But being granted, that in men, likewise as in Dogs, it may naturally be Acidly Salt, Whether then will our Hypothesis run? No-whither: Because a Salitude joyned to it, as hereafter shall be declared, doth no way impede its primary Operation.

C H A P. V.

*The Liquor of the Glandules in the Body,
it demonstrated to be necessary, and
that the Pancreatick Juyce doth efferve-
scence with the Bile.*

ALL these things premised, deservedly, who can ask what the Juyce of the Glandules may perform in the bodies of Animals? To whom we shall answer, that the juyce of all the Conglobated is subservient to Sanguification, but the liquor of the Conglomerated is ordained to other uses: For that which is generated in the Maxillary Glandules, and other of the Conglomerated, placed about the cavity of the mouth, for the most part absolveth the Fermentation of Aliments in the Stomach: And that liquor which is generated or separated in the Conglomerated Glandules of the Pancreas, seems

Chap.5. *of the Pancreatick Juycce.* 47

seems to us to perform far more : Seeing that Nature for the most part so wisely disposeth matters, that one and the same thing may be accommodated to many.

But seeing the use thereof is not yet sufficiently known, we shall examine what is first effused from it into the thin Intestine, and also happeneth in the same.

There is a sufficiently large quantity of this Pancreatick juice continually brought to the thin Gut (we remember there hath been collected from one Dog, in the space of seven or eight hours, two Drachms, half an Ounce, and from a Mastive an intire Ounce) that it may be continually lifted up, and fermented with the Bile flowing from the ducts of the Liver, to a double or tripple quantity (for as much as we could observe by the benefit of an instrument applied to their passage into the intestine in Doggs) being therein carried with a certain strugling motion.

That this Effervescency is excited from the acidity of the Pancreatick Juice, and the course of the Bile abounding with a fixed and volatile salt, we dare the more freely assert; because hitherto we have seen no example of an acid spirit concurring with a lixivate salt to happen without an effeverscency sufficiently manifest, so that all impediments were taken away. That both salts are found in the Bile, Chymistry that most excellent and famous Medical instrument of truth doth prove; by the benefit of which we can separate a volatile

tile salt efferverſcing with an acid ſpirit, and lixivious ſalt more manifeſtly abſolving the ſame work. But that the Pancreatick Juice containeth in it ſelf an acidity is manifeſt by an experiment above-recited; the which, for their ſakes who are lovers of truth, and whoſe belief derogates not from their proper Senſes, as in the Academies of diverſe Regions, we have performed both publickly and privately, we have declared, not again to be repeated: and it is notably confirmed by an experiment which the moſt accurate ſearcher of nature, *Florentius Schuyl*, in his written Tractate for ancient Medicine pag. 94. deſcribed in theſe Words:

Moreover, I have opened the Abdomen of another Living Dog in the ſame Method, and in the Inteſtinal Bilar Ductus, which is common to the Cystic and Hepatic, by a Compreſſed Inſtrument in ſuch manner as the Figure repreſents; that the Pancreatick Juice alone might iſſue forth, we collected in the ſpace of nigh three Hours the Quantity of two Ounces of Acidly Sour Juice; whoſe manifeſt Sourneſs was not only proved by the Taſt, but alſo by the permixing it with warm Milk; which was ſo Coagulated, that thereby was formed as it were a Cheeſe, being a manifeſt Experiment, that Acidity was altogether prevalent in the ſame.

Alſo, pag. 157. Writing concerning the Pellicle or Bilar Pore of Horſes; I, (ſaith he) by a double Experience, have found that Pellicle; firſt of all to be Replenished with a Plumour Subacid,

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acid, then with a Bilious Humour, with a Temperate Acidity; into which, in like manner, a Humour, a little Sourish, did flow from the Pancreas, and from thence into the Intestinum Duodenum.

It is likewise concluded, That the Pancreatick Juice, in Men, hath an Acidity in it; not onely from the like nature of all the Bowels and Contents in Brutes and Men, but deduced also from other Experiments: To wit, by sower Belchings, without the Assumption of sower and acid things into the Stomach; and in the Hypoconders forthwith stretched out, or after Rumbling and Noise, first observed in the Belly, presently again breaking out through the Mouth.

Hither also belong those wonderful, and almost inexplicable Motions, and Agitations perceived by the Sick; first of all about the Region of the Loynes, especially after any heavy Affliction of the mind, as anger, terror, Fears, occasioned by the acidity of the Pancreatick Juice, flowing into the thin Gut.

If any one object in the Cases now mentioned, that the Pancreatick Juice is evilly disposed, but that naturally in it self it containeth no Acidity, let him declare: Dr. *Paisenius*, a man joyn'd to us in peculiar Friendship, saith, in his Disputation concerning the Vices of Humours, *How may that Juice Preternaturally wax sower, if in the same, the Seeds of Acidity, as we may so call them, were not Pre-existent.* If we stand by Authorities, no doubt but the Cause

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will fall: For, *Hippocrates. de Veteri Med.* §. XXIV. against those, openly teacheth, That there is not only in man an Acidity, and that mixed with other things, and therewith so attempered, that it is neither Conspicuous nor Hurtful to a man; but also subjoyneth §. XXV. But where the Acidity shall be divided, then it is Conspicuous and Hurtful to man. *Hippocrates* doth not say, That it is arisen, but separated: Therefore it is present in the Natural State, although Inconspicuous.

Besides *Galen* teacheth that Melancholy is fo made of the Blood, as Must is made of Wine.

But now with what Probabilitie may we say, That in Wine, Ale, Milk, and the like Liquors, which left to themselves, without the Addition of any other matter, do grow soure; that the acid parts were not before Existent? What hinders, but that the same thing may also happen in men?

Besides the Reasons and Authorities already brought, we will add the following Experiment, which after a wonderful manner doth confirm the natural acidity of the Pancreatick Juice in Men. In the Year 1666. whilst we were resident in the Academy of *Andegave*, a Shipman, about thirty years of Age; a man of a good Habit of Body, and for as much as we could understand by the Standers by, very Healthful; in his little Vessel, endeavouring to passe under an old Bridge, standing upon the River

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River *Mœne*, with his Mast erected, was by the Bridge, unhappily thrown down, which, falling upon the man, killed him; whose dead Body was immediately brought to the Hospital, where the same being as yet warm, was opened by Dr. *Crofnier*, the Chyrurgion of the same Hospital, and our self; in which we collected the Succus Pancreaticus, which we exhibited to diverse curious Tasts, who judged it to be acid; and for our own part we freely profess never to have found it more gratefully acid in Dogs.

Who is he, these things being rightly considered, that doubteth of the Effervescency happening between the Pancreatick Juice, and the Bile rightly Constituted? Yet, lest it should in any part seem deficient, we will set down, in few words, those Primary Objections and Difficulties, both here and in other Countries proposed to us against this Effervescency; the which being cast off, doubts of lesser moment will be ready to fall of their own accord.

The first Difficulty is, That the Pancreatick Juice, as often as it hath been found by us Insipid, hath not in the least been able to raise an Effervescency with the Bile in the thin Gut. To this Objection we answer, That it doth not follow, that the Pancreatick Juice, sometimes found by us Insipid, should, at that time, have in it no Acidity. Concerning which matter, let them consult *Galen De Simp. Med. Fac. Lib. 3. Cap. 13, 14, 15.* as also *Hippocrates*.

erates, in that place before alledged, saying, That in many mixed things, there are Substances of various Qualities by Act, in which, nevertheless, those Substances are not found. The same is confirmed by daily Experience, whereby it is evident that diverse Liquors are rendered insipid, whose Effects we allow to consist, partly in acid, partly in Lixivious parts; for example, the Spirit of Salt, which is most sharp, may be so dulcified with Spirit of Wine, that no acidity may be perceived in it; yet notwithstanding it failes not to Effervesce, if it be permixed with a Lixivious Salt; so also, in infinite other things, which appear not acid, by reason of the Acid Particles which are in them, do excite Perceptible Effervescencies both to the Sight and Touch. But we do not absolutely deny, but that the Pancreatick Juice may be sometimes generated so Sluggish, as that it may scarcely, indeed not at all ferment with the Bile; but we then judge it to be distempred or Sick. Yea, that those Animals in whom it so happens, do sometimes dye by reason of the Non - contingent Effervescency: But this doth not destroy the Natural Effervescency.

The Second Difficulty which hath been proposed to me, is, that seeing our Bile and Pancreatick Juice is diluted with the Chyle, they cannot Effervesce: But to this Objection we shall answer; That Oyle of Vitriol, being mingled with Pure water, doth stir up a greater Effervescency with the filings of Steele, than

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if it were mingled therewith alone without Water; and which is yet more, if after the said Effervescency hath ceased, if fresh Water be added to it, the Oyle of Vitriol, with the Steele Dust, will ferment again afresh. But that we might have an Experiment which might come nearer to our busine's, we have taken Cows Milk, as having a very great Affinity with the Chyle, and have poured to it Spirit of Vitriol, mingled with the Lixivious Salt of Tartar, and the Effervescency was presently excited, which continued a great deal longer, than if the Oyle of Vitriol, and Oyle of Tartar per Deliquium, had been mingled without the Milk.

We judge that the long continuance of the Effervescency, ought to be ascribed to the Viscidity of the Milk, seeing that daily Experience teacheth us, that Milk, Honey, and other things, may be more, and longer rarified, whilst boyling, than Distilled Waters, Spirits, and other the like things, not having a Viscidity.

According to which, in the said Experiment, it is worthy of note, That the Effervescency (perhaps by reason of the Coagulation of the Milk) doth not so well happen, if the Spirit of Vitriol be put to the Milk, before the Oyle of Tartar per Deliquium: Hence (with the safe Opinion of the more Learned) a Reason seems to us to be sought into; why commonly, in all Animals, the Ductus Biliarius, either first, or with the Ductus Pancreaticus, do enter into the I testine, E 3 From

From hence may be answered their Difficulty, who say, That in some Animals the Distance between the Ductus Pancreaticus, and the Ductus Biliarius is too great: It is not necessary, that this Effervescency should alwayes happen immediately under the Pylorus; but the Matter may be carryed some fingers breadths further, where at length it may ferment; namely, when the Pancreatick Juice, with the Diluted Bile, is mixed with the Chyle: because those Animals, in whom so notable a Distance is found, have alwayes (for as much as we have happened to see) very long Intestines; as may be seen in Conies, Hares, and very many other Animals. Moreover, neither need it be feared, that our determined Effervescency, by which the profitable parts of the Aliment, are separated from the unprofitable, should happen too slowly; seeing that in those Animals some one Passage or Channel of the Intestines, may be over and above, sufficient to receive the profitable Particles of the Chyle.

The third Thing which we have observed is, That the natural heat of our Hand would more increase that Effervescency, than the artificial Heat of Fire. After the same manner we read in Chynical Books, That the Heat of Horfeding performs many things, which could not be expected from our Artificial Fires, but with the greatest Difficulty.

Which seeing it is so, no man ought to admire, that we are not able to Demonstrate the Effervescency.

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Effervescency, between the Bile and the Pancreatick Juice, without our Body, whilst they remain in their Temperate and Natural Estate; because neither artificial Fire, nor the natural heat of our Hand, can stir up such a heat as we know to be excited in the Small Gut, by reason of the Circumjacent Bowels, which are most hot.

But some perhaps, being little content with these Reasons, will say, That to see that naturally Effervescency, it behoveth to open a living Dog; seeing that as yet in him the natural Heat is in its Vigour: the which seems to carry something of force with it, with those who consider not that in a Preternatural Disposition of the Body, we cannot know its natural Operation; as also with those who have never moved their Hand to the Work; because those things which happen in the Intestines, cannot be seen, unless they be opened, and many Vessels must necessarily be dissected when they are opened, out of which flow such an abundance of Blood, that it is impossible (as we have often experienced) to see the desired Effervescency.

Add, that the Succus Pancreaticus cannot alter the manner of a rushing Torrent hasten it self into the thin Intestine, because this River flowing as it were from so many Springs and Rivolets, as the Pancreas is environed with Glandules and little branches, doth by a pleasing course continually slide into its own Channel; So that the cleansed juyce being now ef-

fused with the blood, you cannot without a very tedious delay collect a sufficient quantity of the Pancreatick Juyce to be fermented, and which in the mean time will be so altered by the cold Air, that it will be in vain to expect an Effervescency perceptible to the sight.

“ For it very much agrees with Vulgar Observation (saith the most learned *Willis*, *Exercitat. Medico-Physic. de sanguinis incalescentia*, Fol. 85.) That fermentible Liquors when “ closed more strickly in the vessel, do most “ ferment, and presently cease from their Fer- “ mentation, if the Air be admitted through an “ opened Hole : More-over, *Boyles Experiments*, *Experiment. Physico-Mechanicor.* 41. 42. 43. do most clearly shew Effervescencies to be excited from the Ebullition of dissimilar particles, or by Corrosion; also the Ebullition of Hot water in a glass Sphere to be wonderfully augmented after the Air is sucked out, and that there are some things which in a space of time, are intended in the Air to a great Vacuity; whose action after the air is drawn out, is presently extinguished : So that without reason they desire that the Effervescency between the Bile, and the Pancreatick Juyce should be manifested to the Eye without the Body: For it is plainly ridiculous to be willing to see the Effervescency of those Humours, and to impede the Humours by which they are performed; or not to admit of the preturnal constitution of the Animal, and willing to see those things which

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which are performed in the Bowels of Animals.

If their Pancreatick Juyce who desire this thing, were endued with such an Acrimony. as nevertheless being destitute of Natural helps, might ferment with the Bile to the Eye without the Body; with how great pains would not their bowels be tormented, if being helpt by those aids in the body, the Effervescency should be performed; doubtless they would not desire such an aciditie, before they would subscribe to our so often commemorated Fermentation, but in short, would wish for themselves such a Pancreatick Juyce, as we have above deemed to raise up therein a Natural Effervescency.

Lastly, The third difficulty which hath been proposed to us against the Effervescency between the Bile and the Pancreatick Juyce, is, that the Pancreatick Juyce being acidly salt (as it is ordinarily found in Dogs) ought not to ferment with the Bile: Seeing that the acidite thereof, by reason of the Salt therein contained, helping the innervated Liquor will be subdued.

But we may easily answer this Objection also, by distinguishing Sea - Salts, Fossile - Salts, and others compounded of a Lixivate - Salt, and Acid - Spirit, from the pure Lixivate Salts. No man will ever deny, but that the last of Acids doth lose its Force and Energy, and consequently hinders its Effervescency. But that which appertaineth to the first, of whose Nature

ture we esteem that to be which is in the Succus Pancreaticus; (forasmuch as we can perceive by the Taste:) All men will easily grant that that in no wise hindereth the Effervescency, of those things, especially, which have an acid Spirit; as for example, that of Vitriol, in which was dissolved Sea-Salt, mixed with the Lixivious Salt of Tartar, or Oyle of Tartar per Deliquium.

Yea it is so far from diminishing the Effervescency, that it exciteth a greater than otherwise would happen; as Sal Armoniack dissolved in Oyle of Vitriol, so highly accuates it, that it dissolveth Gold, the which without it could not be done. Hence perhaps it cometh to pass, that Dogs, which devour Bones, and other Aliments, of difficult Concoction; which cannot be dissolved by an acid Spirit alone; for, the most part have their Pancreatick Juice acidly-Salt.

Among those things which we have asserted, concerning the Pancreatick Juice insipid, acid, salt, &c. it is sufficiently manifest, that the diversity observed therein, excludes not the Acidity thereof; neither destroyes its Effervescency, which we have taught to be made in the Thin Gut, without any Interruption.

But we have sometimes observed a pleasant Effervescency of the Bile, with an acid, in the Bile of a Dog, closed up in a Glass Viall, after having poured on about a third part of Spirit of Niter, and keeping it a while in the warme Rayes of the Sun.

But

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But that we may come nearer to the matter, we will declare the Experiments brought by Dr. Schaylius, to demonstrate the Effervescency between the Bile, and the Pancreatick Juice, in the presence of many Students; in his Treatise *Pro Veteri Med.* pag. 88. Therefore (saith he) the *Abdomen* of a Living Dog being opened, I have bound the *Duodenum*, not far from the *Pylorus* with a Ligament; and also with another a little below the Insertion of the *Ductus Pancreaticus*: then left the Dog to himself, his *Abdomen* being sowed up. Three Houres being elapsed, the Dog, as it seemed, yet living; for he had onely left some few drops of Blood: The *Abdomen* being opened, we found the Space intercepted between the Ligatures, vehemently distended; so that, it would altogether resist the Compression of the Fingers, and threatened a Rupture. Neither did we find the Gall Bladder less distended: Also that that Intercepted Space of the *Duodenum* was possessed, with an Intense, and burning heat; in which making a little Wound with the Lancet, the contained Wind, with the Humour, broke forth with a bouncing Noise, also Vapours and Exhalations; from whence a certain sharp stink did strike all our Nostrils, the which was greater by the opening of the Intestine; so that, none of the Students standing by were able to bear it; which was a manifest Argument not onely of the large quantity of the Bile, and Pancreatick Juice, which had flown thither: But also of the Effervescency, which had been in them Excited;

ted; not only to a Mediocrity or Gentleness, such as happens in Health, but Vehement: For, that part of the Intestine was not only full, but also by a cert. in Force and Fermentation much distended.

Neither could that part of the Duodenum distended, have dissipated the Wind, Humours, and Exhalations, with so great a Force, unless by the Effervescency or Agitation of the Particles of those contrary Humours. *Qui cupit, Capiet.* A few dayes being past, I repeated the same Experiment in the Presence of many Students: And after the space of two Houres, that Portion of the Intestine, did swell in like manner as before, but less hot: But that swelling Portion of the Intestine, which before I had bound, being opened, frothing Bubbles broke forth with a noise; the which had so distended that part of the Intestine, that no man may further doubt of the Certainty of this Effervescency.

CHAP. VI.

What this Effervescency is both in the Sick, and in the Sound; and what Benefit Accreus to the Body thereby.

SEeing then that it is more than sufficiently convinced, and granted by Reasons and Experiments, that there is an Effervescency between the Bile and the Pancreatick Juice, in the Thin Gutt, and that continually, we will further enquire, what it is in the Sick, what in the Sound, and what Utility it bringeth to Humane Bodies.

In the Sick, we often observe, That this Effervescency, either by its Fretting, and Tormenting Paines, or else by Heat or Cold, is very troublesome, as some Years since, we knew in our dear Kinsman; who sometimes, for a whole week together, came himself to us, to perceive a cold Ebullition in his Right side, and that in the place where the Intestinum Duodenum is seated; and the Bile runs together with the Pancreatick Juice; and that afterwards, by the meanes of Medicaments, meanly hot, to be changed into most hot, continuing a Fortnight, and longer.

That

That both these Effervescencies, viz. Cold and Hot, may be excited, is proved by the Thermometry, most ingenuously contrived by the Learned Swammerdammius, and depicted in his Treatise of Respiration, Page 108. In the depressed part of which Supream Sphear *A*. if you mingle together Salt of Tartar, and Spirit of Vitriol, an Effervescency will presently be excited; and such indeed as will so condense, or thicken the Air contained in that Spheare, that the Water, contained in the lower part of this Instrument *B*, may ascend upward: being a manifest Experiment of Cold, produced by that Effervescency. But, on the contrary, if you mingle Spirit of Tartar with the Spirit of Vitriol, you shall observe, by the Effervescency excited between them, that the Water is depressed; and the more, if with those Spirits, you conjoyne the Oyle of Turpentine; from whence no man, who is endowed with the lightest Tincture of Philosophy, but will judge, that to proceed from the hot Effervescency, rarifying the Air contained in that Sphear.

Therefore we judge, that in the Sound, that Effervescency happens after a gentle manner, because then there is no Sence thereof: The same thing is to be said concerning the Motion of the Heart, and beating of the Arteries; the which, although they are Continual, are not perceived by those in Health; but when we are evilly disposed, they sometimes manifest themselves in diverse parts of the Body, especially in

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in Temples, the Pulsation of the Arteries is so manifestly molested, as if they were contused by some hard body. By the same Reason the Motion of the Heart, is sometime so vehement, that as it hath been observed by Practitioners, it might in a manner be heard to their Neighbour Houses; yea it hath sometimes broke the Ribs; as in like manner, we have seen at *Leyden*, in a Baker's Son, dwelling in the Fish-Market; whose Ribs, by the Vehement Palpitation of the Heart, or rather the Convulsive Motion thereof, were Conspicuously driven outwards; from which Vehement Palpitation, it was freed in a short time with Medicaments, prescribed by Dr. *Sylvius*; yet not so, but that the Ribs still remained driven outwards.

Surely this is an Hypochond.

But now if any ask unto what end and use this effervescency between the Bile and the Pancreatick Juyce, being naturally excited, doth happen? We answer first of all, that it serves to cut, and attenuate the over viscus pitiuity adhering to the sides of the Gutts, lest they being stufft up, the pores of the *Vena Lactea* should be obstructed, or a passage be denied to the Pancreatick Juyce, and the Bile continually sliding into the Intestinum Duodenum, or also, lest by the too great abundance of Phlegme, the sence of the Intestines might be obtunded, and their peristaltick Motion either be diminished, or abolished, by help whereof, not only the passages of the parts necessary for the nourishing

ing of the body may be facilitated, but also the more grosser Foecies and unprofitable Excrements may the more commodiously be separated; which use *Gallen* hath ascribed to the Bile alone, as not knowing the Pancreatick Juyce, first by us discovered, nor the Effervescency excited between it and the Bile: Therefore he saith in *Lib. 5. De usu partium*, cap. 4. "A
"necessary Excrement (to wit Phlegme) of
"this sort, is to be found both in the Stomach
"and in the Intestines, as we have elsewhere
"demonstrated: but that it may be generated,
"both Anatomy, and those Diseases to which
"men are daily subject from the abundance of
"the superfluities hereof do declare: The
"Cure whereof is simple, to wit, by the Ex-
"hibition of those things which have power
"to divide, to cut and cleanse viscous mat-
"ters.

"For that cause therefore Nature hath from
"the beginning provided a Defence for them,
"that this Juyce being sharp, might be cleans-
"ed, and as it ought be altogether separated
"from the body, not into any Intestine near the
"Anus; but into the first Intestine taking its
"beginning from the Pylorus, neither some-
"times may it want the external Help of some
"of the inferiour Intestines. Moreover, as
"long as the body is rightly governed, the pi-
"tuitous Excrement is daily cleansed. But
"when it is more copiously collected by some
"evil affection of the body, the most famous
"Physicians doubt nothing, but that those most
"grievous

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“grievous Diseases which happen to the belly,
“as the Ileum, Lienteria, and Tenesmus, may
“be occasioned by it. Neither therefore is
“that Translation to be contemned which Na-
“ture hath provided for Health, by the oppor-
“tune immision of the Bilious passage in Ani-
“mals.

The same Office is no less to be ascribed to the Pancreatick Juyce, then to the Bile hereafter to be made conspicuous by the Description of its acid Qualities. Before we go any further in declaring the Effects arising from this Effervescency, we will premise some Fermentations, that these things being with all possibility inspected, it may become the more obvious, what benefit the Intestinal Effervescency bringeth to the Aliments after their propulsion to the Gutts.

As many as have mingled filings of Steel with Oyl of Sulpher, prepared Per Campanum, or Spirit of Vitriol, having added a sufficient quantity of water, they might observe an Effervescency to be excited after a certain manner by the concurrence of those contraries; by help whereof, the laudable parts of the Steel are joyned to the acid Spirits, whilst the rest counted as refuse, do partly go to the bottome, and partly like Froth swim or float upon the Liquor.

But I think that the more purer parts of the Steel, and those most exactly mixed, are therefore joyned to the acid Liquor, because they have therewith a more greater affinity, because

of which they suffer themselves to be dissolved; but not the other more Impure and less mixed among them, whether they be more Terrene, and therefore seek the bottome, or whether they be more Oleus, and therefore Supernatant.

The same, greater or lesser, Affinity of Acids, with the dissolved Matter, doth further appear, if in the same Liquor more Mettals be successively immitted; First, those which have a lesse; afterwards, those which have a greater Affinity with it: So, when Silver is put into Aqua-Fortis, and so long detained therein, till it be all dissolved; which Effervescency, is absolved with its Coagent: hence let Copper be put to the afore-said Solution, the Aqua-Fortis will leave the Silver, and begin a new Effervescency with the Copper, whilst that the Silver, being gradually neglected by the Aqua-Fortis, gets to the bottome; which Mutation, by the Chymists, is called by the name of Precipitation.

But if afterwards, you cast Iron to this Solution of Copper, the same thing will again come to pass, and by degrees the Copper will be precipitated to the bottom. Which if again, to the Solution of the Iron, you affuse some Lixivium of Calcined Tartar, Vine Ashes, or the like, the Acid Spirit will joyne it self more strictly to the Solution of that, than of the other Mettalick bodies, and will scarcely suffer it self to be separated from the same.

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The Reason of this more straight Union is to be required from the more pure Acid Spirit, that is less mixed, and therefore more narrowly joynes it self with the said Lixivate fixed Salt; hitherto also more pure and less mixed, than with the same Salt; but less pure, that is more mixed: So that, here the purity of the contrary Parts ought to be understood by their Affinity.

By reason of this greater Affinity, the Oyle of Tartar prepared per Deliquium, (which is nothing else but the Salt of Tartar, dissolved by the Humidity of Air) when it is in like manner poured with the Vitriol into Water, it joyneth it self to the acid Spirit, existing in the Vitriol, whilst its Sulphureous part, as having a lesser Affinity with Acidity, by little and little departs, and gets to the bottom.

Which being premised we will consider, what things may happen in the Aliments in the Stomach by its Fermentation, and what also befalleth the same, (after the aforementioned Fermentation) in the thin Gut especially, that we may conclude something more certain, and more probable than usual. First, The Stomach, being opened, together with the Guts, seeing that the Aliments, by an absolute Fermentation, are wont to be driven from the Stomach to the Intestines, we have observed a notable Change between that which is contained in the Stomach, and that in the Guts: For, that in the Stomach hath had a more grosser, and Vis-

acid Consistence, and by the Diversity of the Aliments, and other things assumed, a diverse Colour, and oftentimes less White.

Certainly, this Mutation cannot be derived from any other thing than from the Bile, and Pancreatick Juice: Because those Humours only flow in a large Quantity to the Superiour part of the small Gut, and are admixed with the Aliments.

The Examen of both the afore-said Liquors, doth confirm this our Opinion: For, the Bile, abounding with a Volatile Salt and Oyle, hath a force of Inciding, Attenuating, and making Fluid most things where-with it is permixed, especially such as are pituitous; as *Galen* also teacheth, *Lib. V. De usu. Part. Cap. IV.* as by the place above quoted may be seen, to which *Platerus* subscribes, *Cap. VIII.* concerning the Defect of Hearing by the Repletion of the Eares, whilst he breakth out into these Words:

First, he declares that *Aqua Malsa*, or *Hydromel*, or if to cleanse more powerfully, with the Decoction, or bitter Juice before-mentioned, of *Worm-Wood*, *Centaury*, or *Lupines*, that may be effected, adding *Honey* or *Gall*, which, above all other things, as hath been often said doth make those things, which are *Viscons*, *Fluid*, &c.

But the *Succus Pancreaticus*, being pregnant with a Subacid Spirit, as appeareth by the Precedent Reasons, and Experiments, doth in like manner augment the Viscidity of the Aliments

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Aliments by the Solution of their Fluidity; the which, being so as it is more than sufficiently known, we will not delay time, by further proofs concerning the Manner, wherby Acids in the thin Gut, do return to a Liquid, and Fluxile Motion, or other-wise to an Inept and Pituitous Viscidity; we shall only say that in our Judgement it so happeneth; for as much, as by the Tenuity, and Sharpness of the Parts, stirred up by the Effervescency, the Phlegme is thereby as with Swords, incided, and attenuated into very Minute Parts. That which attaineth a Whitish Colour, then observable in the more Fluid part of the Aliments, we think it deducible from the Acidity of the Pancreatick Juice; because we may note, that many other things, abounding with a Lixivious Salt and Oyle, do wax White upon the affusion of Acids: So, that Vinegar or Sharp Wine, being poured upon common Sulphur, dissolved with any Lixivium, and grown Red, that Reddish Colour is so changed, that it is made almost like to Milk: Wherefore also it is called by the Chymists *Lac Sulphuris*. The same is apparent in the Resinious Extracts of Vegetables, as also in Spirit of Hart's Horne or Soot, being Replete with much Volatile Salt; with which an Acid Spirit being mixed, acquires a Milky Colour. All those things being rightly considered, we judge, *Secondly*, That the Effervescency, in the thin Gut is exceeding necessary for the right Separation of the profitable Parts from the unprofitable. But

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perhaps some, who are altogether wedded to Antiquity, admitting nothing which to them is Novel, because they have read or understood nothing, in the Antients, concerning this our expected Secretion, by Fermentation, will not think that such a preparation is required to separate the profitable parts of the Aliment from the unprofitable; but that the alteration which is performed in the Stomach, is sufficient to this purpose; in which, if any thing be wanting, it may be Consummated by the Peristaltick Motion of the Guts; by the help whereof its more Fluid parts are thrust forward into the Milky Veines, the Fœces, with the remaining thicker and lesser profitable parts, passing away by the Channel of the Intestines.

To the which we deny not, but that something is contributed to this matter both by the said Fermentation and the Peristaltick Motion of the Guts; nevertheless we do not think that any Physitian, unless a Slave to the Antients, amongst all those things which are daily observed in the dissecting of Brute Animals, and Medical Practises; or at least-wise may be observed, will reject this cause proposed by us; If, first of all, he diligently consider, that in the Coeliac Flux the Aliments, sometimes viscid like a Pultis, and every where alike, and sometimes mixed with a whitish Liquor are purged out.

But this Diversity of Colour happens, by a Contingent, or Non-contingent, Secretion of the

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profitable parts from the unprofitable, by the said Effervescency; which, who can but in vain, Attribute to expression alone.

Yet we deny not, that by the Fermentation of Aliments alone, rightly performed in the Ventricle, something Fluid may, Spontaneously, pass away from the rest of the Aliments more Pultitious; nevertheless that is but little, if it be compared with the large quantity of noble Chyle, which is continually strained through the Venæ-lactææ, or also from thence swimming up in the Cæliack Flux; so that, then the more watery part of the Chyle, freely going forth by the Compression of the Bowels alone, is more without Effervescency, than the other which is more white, or, as we may say, more Milky.

In that Spontaneous Separation of the parts wont to happen through Fermentation, the Spirituous indeed first go forth with the Watery, necessary for the Reparation of the Animal Spirits: We have an example in the Fermentation of Plants, & other things, abounding with a Volatile Spirit, in which the Spirituous Particles, alwayes expanded, and endeavouring to flee through the Pores of the Stomach and Guts, being loosed from their Fetters, rush through the Pores; From whence we are fully perswaded, that after the Assumption of the most Spirituous Aliments, a suddain strength is found in men; and although it be Inconspicuous to our Bodily Eyes, that the Spirits, by the same reason, are diffused through the Pores of the Body; never-

vertheless, after a manner, we understand it with the Eyes of our Mind, whilst we see a Stupendious Vertue in some Medicaments externally applyed: The same thing is often observed by Anatomists, when after the Incision of the Peritonæum, they receive the Foetid Flatulencies passing through the Tunicles of the Guts to the Nostrils.

But because the Spirituous and Volatile parts are not sufficient to sustain Life; but, Moreover, Acid, Oleous, and Salt parts, are also required; therefore there is need of a new Alteration of things assumed, that those parts, by a decent Copiousness, might be separated from the Superfluous and Unprofitable: Which alteration we call Effervescency, and by help of which, we judge (with our sometimes Famous Professor *Francis. de le Boe-Sylvius*, from whose Lectures, as well publick as private, we do not deny to have drawn many Fundamentals of this Doctrine) that Secretion to be accomplished.

We do not only judge by that Effervescency, mediateing the more Subtile and Fluid parts of Aliments, but also the Pityuy by the help thereof dissolved in the thin Gux, part of which is carryed together, with the better Portion of the Bile, and Succus Pancreaticus, through the Vermiculous crust of the Intestines into the Milky Veines; from hence to the Cisterne or Common Receptacle of the Chyle, and Lympha, placed in the Region of the Loynes under the Appendices of the Diaphragma; and
from

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from thence ascends through the Chyliferus, or more rightly the Lymphatick Ductus, Thoracicus, (because it continually carryeth the Lympha, and the Chyle, only by Intervals) to the Subclavian, or left Jugular Veine, that from thence it may descend, with the Blood, through the Superiour Trunck of the Vena Cava, descending into the right Eare of the Heart, and the right Ventricle thereof. And in the right Ear, and right Ventricle of the Heart, it is confused both with the ascending and descending Blood, and also impregnated with the Pancreatick Juice, the Bile, Phlegme, and Lympha; from whence it acquires a requisite Consistency of Blood.

This confirms what we have said; That any thing acid Coagulates all Fatness and Oyle.

But because, on the other side, the afore-said humours have in themselves a force of attempering, we need not fear too great a Consistency of the Blood; so long, as at least they remain in a Laudable and Natural Estate.

But seeing that the more fluid and more profitable parts, as well of the Aliments assumed, as of the three nominated Humours, do go to the Heart; the rest more gross, and less profitable, by the Peristaltick Motion of the Guts, gradually without Sense, are driven forwards to the thick Guts, where they are distinguished by the name of Alvinary Foecès. Whether also the Exhalations, excited by this Effervescency,

vescency; or even the Juice it self may not afford a natural Fermentation in the Stomach, we dare not as yet assert; although some Animals seem to perswade it to us, of both whose Ducts, to wit, the Pancreatick and Bilar, Nature hath determined a passage into the Stomach. We judge this Pancreatick Juice is not onely Subservient to the Functions, already declared, but also by the Sub-acid Spirit with which it is impregnated by the most wise God, we think it to be ordained after a certain manner, to Incrassate, and Inspisate the more fluid Bile, and also to temper its too much Acrimony; This thing is manifest in the Bile by affusing any acid Spirits thereto, which presently, either more or less, will be thickned, and its more gross part precipitated to the bottom, whilst its Thinner part floats on the top like Phlegme. Hence peradventure *Hippocrates, Lib. De Victu Accutorum*, Text 29. 8. 9. teacheth that bitter things are dissolved, and pass into Phlegme, that is, They becomie sluggish whiles they are spread or mixed with an acid, which is not only confirmed by the Authority of the Divine old Gentleman, but also by a daily Effervescenteny; whereby it is evident that Acids, and Salts, being put into a Conflict amongst themselves, do so infringe their sharp Particles, that they become almost temperate: Wherefore not without Reason *Hipp. Aph. I. Sect. VI.* hath taught us in the daily Levities of the Intestines, That if an Acid belching should supervene, which had not been before, we ought to

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to hope well : For it is a signe that the Pancreatick Juice, by its acidy, will, in a short time, attemper the Acrimony of the Bile.

We have said that the Pancreatick Juice is ordained by Nature, after a sort to incrassate the more Fluid Bile ; but it may also so happen that the Bile, by its Acidity, may be rendered more Fluid, viz. when the Viscidity of the Bile dependeth upon the Viscidity of Phlegme ; therefore in one respect Acids may render the bile more gross, but in another more Fluid ; for Acids do incrassate Fats, and Lixivious Salts.

Among those things which we have now recited, it is sufficiently evident, in the Humours naturally constituted in the small Gut, and the Friendly Effervescency of Nature from thence occurring, that many Functions in the Body are rightly performed ; which by the said Effervescency evilly happening, are wasted, and become Vicious. The verity of which thing, that we may make it more clearly appear, we shall, first of all, declare some Vices which happen in the Substance of the Pancreas. Secondly, We shall adjoyne those things which may befall the Juice thereof.

CHAP.

C H A P. VII.

*With what Diseases the Substance of the
Pancreas, and its Juice may be Mole-
sted.*

Certainly not a few, to whom the Pancreatic Juice hath been unknown, have nevertheless believed that the Causes of many grievous Diseases lay hid. For, *Schenkius* in his *Exercitatione*, Anat VI. Lib. I. Sect. II. Cap. XXI. saith, *And there are the Seats* (meaning the Pancreas, and the Mesentery) *of innumerable and wonderful Diseases; for the searching of which, the age of one man is not sufficient. Which thing, being the Scorne of Physitians, also casteth those which are most exercised into a Blushing hue.*

Fernelius also Lib. VI. *Pathol.* Cap. VII. speaking concerning the Diseases of the Pancreas and Mesentery, doth affirm and profess, *That he hath thought for the most part, these to be the Seats of Choler, Melancholy, Diarrhaea, Disenteria, Cachexia, Atrophia, of Languishing, of Light, and Erratick Feavers: Lastly, the Causes of hidden Diseases; by the driving away of which, Health might be restored to the Afflicted.*

And

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And *Riolanus*, that Egregious Ornament of the Univerſity of *Lovaine*. *V. F. Flempius*, with other Famous men, alſo Converſant in Practiſe, do alſo think that the cauſe of intermitting Feavers, of Hypochondriack Melancholy, and other Chronick Diſeaſes, do lurk; or lye hid in the *Pancreas*. But this buſineſs, without all doubt, had been more ſucceſsfully treated of both by theſe, and other men of no ſmall Merit in Medicine, had the *Pancreatick* Juice, with its Generation and Nature, been known to them: Wherefore we ſhall endeavour, being excited by their Commendable Examples, to produce ſomething to the Learned World for the Common good, by conſidering firſt, By what Diſeaſes the Subſtance of the *Pancreas* may be infeſted. Secondly, By declaring the *Primary Vices*, which may happen to its Juice. Thirdly, By ſearching into the Functions, which are hurt by its evil Diſpoſition. Fourthly, By inveſtigating the Diſeaſes which follow thoſe Functions hurt. Fifthly, and laſtly, By delivering the Remedies wherewith all of them may be amended. The Diſeaſes wherewith the Subſtance of the *Pancreas* is wont to be moleſted, are Obſtructions, and thoſe which follow them, Tumours, Schirous's, Abſceſs's, Stones, &c. Obſtructions may happen to the *Pancreas* two wayes: Firſt, In the Ductus, when the *Pancreatick* Juice cannot freely paſs through it, into the Inteſtines, even as we ſhall more clearly Demonſtrate to happen, when we ſhall diſ-

course

course of Intermitting Feavers. Secondly, In the Substance of the Pancreas it self, when by any cause, either Internal or External, the Circulation of the Blood through it, is hindered; from whence the Parenchyma, by the continual appulse of blood, is puffed up, and swells, unless it be indurated; or by a previous Inflammation, goes into an Abscessus.

Which, that it may be made known to all, we will bring upon the Stage the Observations of several Physicians, and Anatomists. *Riolanus, Anthropog. Lib. 2. Cap. 16.* writeth, that he had observed in many people, who were of a Melancholy Nature, and Habit of Body, that the Pancreas equalled the weight of the Liver; and also confirms the same, by the Example of the most Illustrious *Augustinus Thuanus*; Who, by the Melancholy Habit of Body, did complain for four Years together of a Collick Pain, about the Region of the Colon, with a Sense of a Burden, or Weight, at his Stomach, while he stood upright, or walked: But his Hypochonders did not swell: At length being taken with an unlookt-for Gangreen, from his right Foot suddenly to the Superiour parts with Horrible and Direful Pains; in the space of Six Hours expired. His Body being opened, and the Liver taken out, was round like to a Sphere, stuffed with Fat, and trans-fixed with a certain pituitous hardened Matter like to Mortar: But the Pancreas, by its Amplitude and Weight, did equalize the Liver, wholly Schirrhous with many little

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little Knobs, which were filled with the Species of a Pigeons Egg; the Spleen was so wasted that it scarce weighed an Ounce.

For which reason, some have called the Pancreas, the Vicar or Supply of the Spleen; not considering that this Diversity might happen to other parts also; and likewise in Doggs, after the Extirpation of the Spleen, the Subtance of the Pancreas did in no wise grow into a greater weight; which, according to them, ought to happen, if the Pancreas supplied the Office of the Spleen.

Aubertus relates a story of an *Abscessus Pro-gym.* ad lib. abdit. Fernelij Exercit. 44. of a certain Merchant of Lyons, which could never sleep, and when he endeavoured to sleep, he fell into a Lipothymie, and cold sweat of the whole Body, till at length he dyed. His Body being opened there was only found a putrid *Abscessus* in the Pancreas; the Stomach and other principal parts being safe. *Guilh. Fabric. Hildanus.* Cent. I. Observ. 71. also relates, that he, in a certain Carpenter, who for the space of two years, by Intervals, was griev-ed with divers Diseases, laboured under Obstructions, and Cachexy: Found in his dead Body, among other things, a Schirrhous Tumour, suppurated like unto a Collection of Fat, under the skin, about the bigness of two Fists; having its rise from the Inferiour part of the Pancreas, which inclosed the Intestinum Duodenum; so that, being covered with the Peritonæum, it also resembled another Ventricle. You

You may read of a Cancerous Ulcer of the Pancreas, most worthy of note, in the Curious Miscellanies Medico-phys, of the *Germans*, (which as in the year 1670. by great Dilligence, they began to bring to Light: So we altogether desire that the great God, for Common-benefit, may prosper their Endeavours:) Observ. 99. where Dr. *J. Fera. Hert. à Tottenfeld* adjoyns these following things, which they found in the Cavity of the Thorax in a certain Chyrurgion after Death.

Coming to the Lower Belly, we saw that Flesh perforating the Diaphragma to be the Pancreas, which was the length of two Spans, and breadth of two Hands transverse, being putrid, and corrupted; which, by its Corosive Acidity, did not only perforate the Diaphragma, but did also so corrode the Spina Dorſi, that a Cancer-like Ulcer was produced, with a light stroke the whole Spina Dorſi might easily be broken. Lastly, it corroded the very Vena Cava it self, which runs into the Spine; by which the Blood, flowing through the Diaphragma, brought Death by impeding the Motion of the Lungs. This Cancer of the Pancreas, by creeping further, did also corrupt both the Kidneys, and caused them to be most black and putrid.

We add more-over, that which the most Famous *Higmore*, Corp. Hum. Disq. Anat. lib. I. part II. writeth that he observed, In a Noble Woman, which being Antient, laboured with Convulsions, Epilepsie, and the Hysterick Passion; and at length, after Exquisite Paines
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and Torments, changed Life with Death; in whose dead Body, being opened, we found the Pancreas onely evilly affected and exulcerated.

They which desire more Examples of Exulceration, let them read *Barthol. Hist. Johan. Dan. Horstij Observ. Anatom. Salmuth, Tulpium, Blasij Comm. in Synt. Anat. Veslingi* and others. That this Pancreas had obtained a stony hardness, in an Antient Roman Woman, is witnessed by *Dr. Panazol*; as is likewise to be seen in *Dr. Blasius*, in his Commentaries, even now cited page 40. In like manner, in the Year 1667. the following History was Communicated to us at *Paris, Bonafide*, by *Dr. Gajen*, a Chyrurgion, and Famous Anatomist, by him before observed;

A Noble Man, aged about thirty, being Melancholy, was Obnoxious to Catthars, by the intemperate use of Wine, and Fruits, continually assumed, fell into a Vomiting, and Diarrhæa, whereby after some space, there followed a Flux of Blood; from whence, more and more failing in Strength, the Tenth day he Changed Life with Death. His body being opened, he found in the Pancreas, about the end of the Ductus Pancreaticus going into the Intestines, seven or eight Stones, having the bigness of the largest Pease; some of which being given us by himself, we keep among our Rarities.

Nevertheless, this Observation to us, seemed not so wonderful, who believe that Stones are

are generated in all the Glandules of the Body, especially in the pineal Glandule: because in it we have more than twenty times observed Stones in men, extinguished either by a gentle Disease, or a violent Death; which thing happens more frequently in *France*, than in *Holland*; a more profitable account whereof, we do not see, than that the Anima of the *French*, as by Nature more Volatile, may be bound to a more firm Residence in their Bodies.

We have also found in a certain Dog, in that part of the Ductus Pancreaticus, where the Ascending concurs with the Descending, and is only simple; a Cartilagineous Excreescency, about the Ductus and its end, which like a Nipple, did hang out into the Intestine, to the bigness of a Finger, in the middle whereof a sufficient passage was afforded to the sliding Pancreatic Juice. *Riolanus* l. c. found the whole Pancreas hardened like a Cartilage.

We might be able to infer many Diseases of the Pancreas, were it not already sufficiently evident by what hath been said, That the Pancreas also may be afflicted with common Diseases; neither that its evil Constitution followeth the affections of the Liver or Spleen: For, sometimes the other Bowels being unhurt, the Pancreas alone, hath been the cause of Death, for Reasons (already) sufficiently alleaded.

For which reason, it is manifest that the Pancreas is necessary to Life, which is also confirmed by an Experiment made by us at *Paris*, in the Year 1667. when in the House of Dr. *Bourdelot*, where, every Monday, the most Curious of Physitians and Phylosophers did meet, we had for three Months together exposed this little Book, in the *French* Tongue, to publick Examination, some being led by Speculation alone, asserted that Animals might live no less without the Pancreas, than the Spleen: For which cause, before all that Company, we extirpated the Spleen, and also most exactly the Pancreas, of a certain Dog: The Abdomen again being closed, Dr. *Bourdelot* commanded his Servants to keep the Dog most diligently, who, notwithstanding all their Dilligence, in a short time Dyed.

Those Vices being declared, which sometimes befall the Substance of the Pancreas, we shall proceed to those things which may happen to its juice; from whence, not a few Natural Functions depending upon its Natural Disposition, are wasted and hurt. First of all, The Pancreatick Juice offendeth when it is more sparingly effused into the thin Gut, which sometimes comes to pass by the more sparing Generation, or Separation thereof in the Pancreas; or when there is an Obstruction in one or more of its lateral Branches; because, for a time the Juice is therein stagnated, till at length the Obstruction is opened.

It is more sparingly generated, when the Matter thereof is more or less deficient in the blood, and not being restored with convenient Aliments; or when the same is carryed off another way; or when it is more strictly conjoynd with the blood, that it cannot be sufficiently separated from it. One or more of the Ducts of the Pancreas are obstructed by a pituitous, and viscid Matter, together with the Matter of the Pancreatick Juice, separated in the Pancreas, and translated into, and detained in those Ducts.

Secondly, The Pancreatick Juyce doth also offend, when it is carryed into the Intestines in greater plenty, whether it be generated more Copiously, or for a time being detained by Stagnation, in one or more of the Laterall Ducts, is then more plentifully Effused, when the Obstruction is Dissolved.

It is generated more plentifully by reason of the Liberal use of acid Aliments, or at least of Condited Acids; for example, soure Wine, Vinegar, Pomecitrons, &c. as also, by reason of some Vice of the Glandules, by which the Separation of that juice, from the blood is promoted; as also, sometimes perhaps, because of more larger Vessels tending into the Pancreas, and as is usual, affording a larger Matter to the juyce.

Thirdly, When it flows inequally into the thin Gut, that is, at one time more abundantly, at another more sparingly: Which, first of all,

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pens by an Obstruction of one or more of the Lateral Ducts, which continuing, nothing floweth out from them; and therefore a more sparing juyce is then effused into the whole :

By the said Obstruction, any way removed, presently that which was stagnant in the middle Duct, together with the rest of the juyce, is effused into the thin Gut; from whence, on the contrary, the Excretion of the Pancreatick juyce is then more plentiful.

That such an Obstruction may sometimes happen in the Lateral Ducts of the Pancreas, Reason doth perswade; and Experience it self confirmeth, even as we shall more clearly evince in the following Discourse of Intermitting Feavours.

Fourthly, It offendeth when it is more Fluid and Liquid, than Natural: which happeneth by reason of such blood, or animal Spirits, more Copiously mixed there-with.

Fifthly, It offendeth, when on the contrary it is more Viscid; by reason of the Blood, likewise Viscid, and abounding with much pituity.

Sixthly, The said Pancreatick juyce offends; when the Natural Relish thereof is changed :

Whence it is one while less acid, another while more acid; one while salt, another while austere; sometimes of a simple Tast, or else Compounded of those before-named.

The Nominated Juice is less acid, either because of the animal Spirits, more plentifully carried to the Pancreas, or for want of acidity in the Blood; whether it may come to pass, by reason of assuming things unfit to repair the acidity taken away, or by the use of such things as infringe, concentrate, obtund, or extinguish acidity.

The acidity of the Pancreatick Juice augmented, for the most part, is to be ascribed to the Redundancy of acid Humours in the Body; sometimes to the Impeded Afflux of the Animal Spirits to the Pancreas; at least-wise, to that part of the Juice which is stagnant in the Lateral Ducts; or other-wise, perhaps, by reason of the Animal Spirits, being Exhausted. An acid Humour is wont to abound in the Body, for the most part, from assumed Aliments, Sauces, or Medicaments, which are sharp, with sharp Wines, such as for the most part is Renish, Mosellanous, &c. as also, because of a more Cold Air, and North Wind, Sorrow of Mind though not over much, &c. The motion of the Animal Spirits, to the Pancreas, is impeded, when the Animal Spirits are defective; or being more dull or slow throughout the whole Body; also, when the Nerves are obstructed, dissected, or compressed.

The Succus Pancreaticus is made Salt by a Marine, or Fossile Saltitude, in like manner, because of the Serosity of the Blood likewise Salt; perhaps by a like Fault of the Glandules

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concurring; for which reason, the Secretion of the Saline parts from the Acid, cannot be absolved: For, our common Salt consisteth of two parts, to wit, a Lixivious Salt, and an Acid Spirit joyned together. The austerity of the Pancreatick Juice seemeth to us, to be deduced from the more gross, or Terrene Particles, with which its acid Particles are involved; which appeareth, not only in Fruits, being first soure, afterwards, when by the gentle Heat of the Sun, they are Ripened, they are made a little more acid; and at length, when the more gross Particles thereof, by the Agitation of Heat, are more exalted, they become Sweet.

But moreover it is manifest, that those things which are sower, it is by their Syncrasis and Diacrisis: So D. *Paisenus* hath noted in *Thesi*. XXI. C. that the juyce of Ribes, being powred to Coral of a grateful acid, becomes austere. Vitriol and Allum distilled, yield an acid Spirit: Likewise an acid Spirit may be distilled from sealed Earths, Bole Armeniack, and the like; but how Bole Armen. may by the help of Nitre and other things, be made more astringent, is to be seen in *Le Febre*, in his French Edition. Page 649.

C H A P. VIII.

The Functions which are vitiated by the Pancreas, or it's Juyce evilly disposed.

HAVING declared the more grievous Vices wherewith the Pancreas and its Juyce are wont to be affected, every man may see, that from that Fountain very many Inconmodities to Mortals do proceed; all which things, seeing we have propos'd to handle them in order, we shall first judge of those which proceed from the Pancreas it self, by subjoyn- ing those things which are wont to flow from its juyce.

If the Pancreas acquire a Schirrous substance resembling Stones, and also weighty in the place where it should defend the Sanguinous Vessels, as some would have it, lest they should be hurt by the Vertæbræ, or other parts, it will greatly afflict them by Compression, and will hinder the circular motion of the Blood, from whence divers Distentions, Inflammations, Obstructions, and other things arise, and spring up, fit to impedit the Common use of the Bowels. Besides also by its weight, it will not a little hinder the Stomach from performing its Office by compressing it; but when it is inflam-
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ed, or Aposthumated, for the most part it will cause the same Incommodities with the other Bowels, being afflicted with the same Vice. But some may say, if such grievous Effects happen to the Pancreas, how can the use thereof be so necessary, and how do we hitherto live so long with them? Then may we also demand how those men may live, to whose Brain, Heart, Liver, and other bowels necessary to Life, the same, or the like things happen, and we shall further enquire of them, by what reason such may live well or ill? The Histories above do certainly testifie, that such live a miserable life, and when the Evil shall be increased, those also for no other Cause have changed Life for Death: So that from that part can no hing be infer'd against our Hypothesis.

Having unfolded the Incommodities arising from the Parenchyma of the Pancreas it self, it remaineth, that we also run through the functionious Hurt, which the evil Qualities, or Vices of the Pancreatick Juyce, or other Humours existing in the thin Gutt, do draw after them.

Therefore the Pancreatick Juyce being driven to the Intestines in a lesser quantity, will not sufficiently free the Gutts from the superfluous Humidity in them, and so will occasion many Obstructions, as the Learned R. Lower, who judgeth this juyce to be ordained by Nature to cleanse the Chyle; he writeth in his Treatise of the Heart, Chap. 5. page 215. that
by

by the defect thereof, he hath observed Obstructions of the Venæ Lactææ, in these very words.

It seems to me most true, that that great Glandule (namely the Pancreas) is seated in that place; and that Ductus to be opened into the Intestines, that the Lympha (for so he calleth the Pancreaticke Juice) being there separated, may be mixed with the descending Chyle, whereby it may more readily enter, and more expeditely pass through the narrow Channel of the Lactean Veins; and indeed the Chyle in the Milkey Vessels, either because of its crasitie, or for want of potentent Liquor (which ought to be for its Vehicle) may sometimes be apt to be stagnant, and so concrete, and by the same reason, to stop, and altogether fill up those Vessels, as in a Dog, whose Pancreas was obdurate I once observed.

Neither also will it sufficiently promote the Natural, and due Separation of the Chyle from the Excrements, and that especially if the Aliments be more dry, or of a more difficult Fermentation: Hence necessarily follows a diminished Nutrition of the whole body, as also a universal Languishing; so that, such may rather be said to draw Life, than to live. But the Pancreaticke Juice, being separated in a larger quantity, and brought to the Intestines, will, as it were, pare off, not only their superfluous Pituity, but also that necessary part which should defend them from Injuries like a Curry-Comb; and besides, it will separate more than it ought, from the assumed Aliments, so
that

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that, sometimes the unprofitable, and excrementitious parts, together with the profitable, may be conveyed to the Mass of Blood; sometimes only the profitable Parts, but in a larger quantity than they should, may be carryed by the same wayes; From whence, if here we say a Pethora will happen, and thence a Caco-chymy, Who can overthrow our Assertions? More-over, we think that the Lancionations, in the left Hypochondria, first molested by courses, do proceed from too great a quantity of the Bile and Pancreatick Juyce, separated from the Blood, by a more vehement Motion of the Body, and the stirring up a greater Effervescency.

For, it is most certain, that Running, or any other vehement Exercise of the Body, doth accelerate the Motion of the Blood, through the whole Body; which, seeing it is the cause of the Separation of these or other Humours, then it is also necessary, that those Humours be deposited into the Guts in a greater plenty; which, being separated in a Natural Quantity, and Quality, if, as we have already proved, they may excite a natural and friendly Effervescency to Nature, may not the contrary happen when they are otherwise disposed by exciting an Effervescency, greater, and troublesome to Nature? After a wonderful manner doth that place confirm this our Opinion, in which those paines are perceived by course, and very ordinarily, though unjustly, are ascribed to the Spleen; because the Spleen is not in that place,

place, where those pains do in us excite a Molestation, but hath its seat more down-wards; because in that place those paines do manifest themselves in the Anterior part of the Hypochondria, where the thin Gut *M*, emerging under the Mesentery *N*, doth lye by the Peritonæum, as is to be seen in the first Table, where we have Delineated to the Life the Situation of that Intestine.

The inequal separation of the Succus Pancreaticus, and propulsion thereof, to the Intestines, produceth various Mutations in the Guts, and else-where, concerning the suddain Happening of which, no man will ever assigne a fit Reason, who will not give heed to those things. Hence we think to be deduced the suddain Deliquiums of the Wind sometimes advening, erratick Feavers, intermitious of Pulses, &c.

The Pancreatick Juice being more fluid, will more dilute the Pituity of the Guts, and perhaps sometimes occasion the Flux of the Belly; especially if it be conjoyned with a Salsitude, by whose acrimony the Guts are provoked to their Contraction; and unless that Flux of the Belly follow the Peristaltick Motion of the Guts, it will necessarily express a greater Quantity of Chyle into the Venæ Lactææ, from whence the same incommodities will arise, which we have deduced from the Pancreatick Juyce, separated in too large a Quantity.

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The more Viscid Pancreatick Juice concreting by the least external Cold, will occasion Obstructions, as also intermitting Feavers, and likewise astringe the Belly. Concerning the sensible Qualities, and first of the Rellish, there is sometimes produced a Pancreatick juycce less acid; from whence there is neither a due Effervescency in the Duodenum, and therefore not a necessary Separation of the profitable parts from the unprofitable, nor a desired Consistency bestowed on the Blood: and therefore they, in whom such Blood is, have been less able to resist Pestilential Venom, than those in whom, by the laudable Acidity of their Pancreatick Juice, have also a more Laudable and greater Consistency of their Blood. Hence the reason is also clear, Why Melancholly Men are less afflicted with the Plague, than those who are endued with a Bilious blood.

For we think that no man may be infected with the Plague, so long as the Natural consistency of his blood is preserved: We assert this the more freely, because we see the blood in all persons infected with the Plague to be altered, and obtain a far more fluid consistency: So that if sometimes by chance, Negligence, Ignorance, or any other urging Cause; as for example, too great a Plethory, spitting of blood bringing a present danger to Life, let a Vein be opened, the blood flowing out although refrigerated; nevertheless, is in no wise coagulated, neither can it acquire a due consistency, even

even as sometimes is wont to happen to the animal Spirits, being loosed from their Fetters, and dissipated from the acidity existing in the blood, wherefore also such a blood by divers Practitioners is called putrid.

We commonly say, because it may so happen, that the whole Mass of blood, not as yet equally infected, the laudible part of the blood in the cutting of a Vein, may only flow out, the blood remaining in the body being depraved; the which thing Practitioners daily observe to happen in Venæ-section; we do not only think with other Practitioners, that the blood remains fluid, without the bodies of those who are infected with the Plague; but do also affirm the like fluidity in the bodies of those extinguished by the Pest, as we have learned by Experience, which perhaps may seem strange to those who know not the Nature of volatile Salts, but not so to us, who have very often mingled it with the blood, and the blood always remained fluid, the which cannot be certainly expected from the commixture of any other thing, with the blood, then volatile Salts.

But on the contrary, if you mingle any acid Spirit with the Blood *Dictum Factum*, the Blood will be more or less Coagulated, according as that Spirit shall be more or less Acid; as for example, if to try the Experiment, we take Oyle of Vitriol, Oyle of Sulphur per Campanum, Aqua Fortis, Aqua Regia, &c. Besides, that the Blood will presently be Coagulated by them, it also acquires a

Ches-

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Chef-Nut Colour. But if we take the Dulcid Spirit of Salt, Juice of Lemmons, Distilled Vinegar or the like, whose acid Spirit is more Temperate, the Blood will only acquire the Consistency of a grosser Syrup, with its red Colour remaining unhurt.

From whence it is evident, the use of Acids may preserve men from the Plague, not, as according to the Opinion of many Authors, that they cut and attenuate; but as they preserve the natural Consistency of the Blood, and do hinder its being infected, with a more sharp Volatile Salt, which we, together with the Air, suck into our Bodies: For this cause, the most Famous Dr. Sylvius, who likewise hath Constituted the Venom of the Plague, in a more sharp Volatile Salt; when, some Years since, in the great Plague at *Amsterdam*, which he fore-saw, he took a Crust of Bread, Imbrued with white-Wine-Vinegar, in which Mary-Golds had likewise been steeped; by which Alexipharmack he so well preserved himself, that he never was infected with the Pestilential Venome. But when, through too much hast, he omitted the said *Alexipharmack*, as soon as he entred into an infected House, he was infected with a pain in the Head; from which, at other times, he was free.

Which things being rightly considered, every one may see that the Pestilent Venome is not indued with any force of Coagulating, as the most Learned *Willis* hath stated it, in his Treatise of Feavers, C. 13. But seeing that Dr. De-

la-Font

la-Font hath sufficiently cleared this to all Opposers, in his Discourse concerning the Pestilent Venome, *Chap. VIII.*

We shall not spend any more time, either to the Reader, or our selves; but wave the further Disquisition of those things; because it is (besides) our purpose in this Treatise, accurately, to describe the Pestilence: Wherefore we will leave the rest to a further Occasion, seeing it is time that we return to the Incommodities flowing from the more Acid Pancreatick Juyce.

The Pancreatick Juyce, being more sharp, is the cause, first, of every Internal Cold, being first of all felt in the Region of the Loyns, and afterwards dispersed into the whole Body; as for the most part, we observe in the beginning of the Fits of Agues, or Intermitting Fevers. *Secondly*, Of all Cutting paines, as well in the Hypochondria's, and whole Belly, as in other parts of the Body. *Thirdly*, Of all manifest paines in the Belly, from whence the Sick is sometimes tormented after a wonderful manner. Wherefore we deduce all the black and æruginous Bile from the same, more Acid, Pancreatick Juyce: Because sometimes being put into a Pewter Chamber Pot, or Brass Bason, they Corrode the same, and send forth a sharp Savour; and also excite a manifest Effervescency; which every man, who hath saluted but the threshold of Chymistry, knows, cannot happen from any thing but Acids: From whence, they may be compelled to

con-

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confess their Errour; who affirm, That all black Choler, proceeding from Vomiting, or Dejection of the Belly, comes from the Follicles of the Gall, or the Spleen.

All these things are not a little confirmed, by the following Experiment, sometimes made by us in a Dog; in the Section of whom, being alive, having opened the Duodenum, we found a greenish Liquor among the black, such as the Antients have depicted to us for *Atrabilis*: that we might pursue a more Intimate cognition thereof, we examined diligently all the wayes through which any thing might be transferred to that Intestine; and seeing that besides the Bilar Duct, the Pancreatick, and the Ventricle, there was no way perceptible to the sight, through which any notable Quantity of Humors might be afforded to the Intestines; we judge therefore, that in one of those, the matter thereof must be obscured: Wherefore we examined all those wayes; in the first whereof we found the Bile, naturally Constituted, that waxing Yellow from a Green: In the second we found the Pancreatick Juyce most limpid, like to Distilled Water: In the third we found the Aliments half crude, having the Colour of White Ashes.

Seeing therefore that neither the Liver, nor the Pancreas, nor also the Stomach, carryed that *Atrabilis* to the Intestine, we began to suspect whether that *Atrabilis* might not emerge by the Union of two or three of those Humours, being mingled together by course.

Concerning which thing, that we might attain to a greater Certainty, we affused Spirit of Vitriol to the Bile, drawn forth from its Vesicle, and placed it in the heat of the Sun; from whence there was commonly excited from the Black, a Greenish Liquor, such as we first found in the Duodenum: Hence we concluded the said Humour, called *Atrabilis*, not to flow from this, or that part, but to be generated in the Duodenum. Namely, as the Natural Colour, of the Bile hath been transmitted into Black, and Green, by the Concourse of the more Acid Pancreatick Juyce.

Seeing that the Pancreatick Juyce, by the ordinary Law of Nature, may continually be mingled with the Bile, and the Intestinal Pity, we will a little propose the same, as joyn'd with those Humours. If it chanceth that the more sluggish Pancreatick Juyce, bounds with a sharper Bile, and the Intestinal Pity rightly Constitued, the strength of the Pancreatick Juyce, in that Concourse, will be altogether infringed; and the Exhalations, which are excited by the Effervescency of those Humours, will ascend, not so much with Acid, as Lixivious Particles; which, when they reach to the Stomach, by infringing its Fermentation, they will hinder the Concoction of the Aliment, and destroy the Appetite: but if it happen that those Exhalations ascend to the Jaws, there, amongst other Incommodities, they will induce a Dryness of the Mouth, especially

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cially if they infect the Spittle with their Salitude: But if they proceed further, through the Milky Veines to the Heart; from whence, with the blood, they may pass through the other parts of the body, they will also produce a Heat in those, as at first in the Intestines; and there more troublesome, where those Exhalations are most sharp.

If a more sharp Pancreatick Juyce concurrerh with a sharper Bile, there will presently be a mighty Effervescency excited in the Duodenum, whereby the Intestines are sometimes so distended, that they threaten a Ruption; which thing we have very often observed, whilst we applyed our selves to our Study in *Leyden*, whilst we mixed together divers Liquors fit for Fermentation in two little Vessels, in part of the Intestine intercepted by Ligatures, (even as *D. Schuyl* hath expressed it, Fig. *B.* in his Treatise, *De veteri Medicina*) wherefore we judge, in the first instant Emission of those sharp Exhalations which way soever turn'd about, that, that Effervescency will excite very many grievous Incommodities; many whereof will also presently cease by the Dissipation of those Exhalations, because either Humour being enervated after that Intestinal Conflict layes down its force, and ceaseth from further contention; for in such an Effervescency the acid Particles are so joyned with the Saline, that without great difficulty they are never to be separated; wherefore as unworthy they are expelled from the body for *Atra-bilis*, if the acid over-grow the Salt, and

get Dominion; in the mean time, they most miserably afflict the body; no otherwise than as Hostile Souldiers, the place through which they pass, by Eroding, and Ulcerating, &c. From whence Fluxes of the belly, Vomitings, Tenesmus, Dysenteries, and six Hundred other Incommodities springing from the Atrabilis will proceed, and those the more grievous, or more gentle, as the acidity of the Pancreatick juyce shall remain more or less, intemperate after the said Conflict.

If besides the Bile, and the Pancreatick juyce offending even now spoken of, much Phlegme sticks in the Gutts, and if the same phlegme be viscous, by reason of the Incommodities already declared, there will happen Flatulencies, the force and energy of which, whereby they are obnoxious to men, he that desireth to be informed, let him read *J. Fiennus*, and others, who have professedly Written of Flatulencies.

If a sharper Pancreatick Juyce concurs with a more sluggish Bile, it will not excite so manifest an Effervescency, but by its Acrimony will stir up wringings of the Gutts, Erosions, &c. but if being more intemperate, passing through the little Channels of the Lactean Veins, it toucheth the first and last residence of life, it will produce the Anxiety of the Heart, Syncope, and many other Incommodities hereafter recited, whose symptoms will be of larger continuance than those which we have deemed to arise from Exhalations, and from thence a greater

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ter Intemperance of the Pancreatick Juyce may be feared, when the Bile, wherewith it is wont to be attempered, is sluggish and insipid, as the most learned *Glisson*, amongst other things writeth, that he hath observed in his Anatomy of the Liver, at the end of the 39. Chapter, where he saith: *There was with us a Woman Cachectick, in whose Biliar Vesicle we found a serous Humour a little pale, little bitter, or rather insipid, but next to a sweetness.*

The like to which we have also observed in the Icteric, or those Afflicted with the Jaundies, in the Year 1664. being Dissected by the famous *Sylvius*, in the Hospital of *Leyden*, whose Bile, whilst we more accurately examined, in the House of *D. Elsner*, in the presence of *D. Kohnius*, we found it plainly serous, and so little indued with a Yellow colour, that a Linnen Rag being put into it, would scarcely be tinged with any Yellowness, and to the Tongue exhibited little or nothing of Amaritude.

CHAP. IX.

*The Diseases proceeding from a vitiated
Pancreatick Juyce.*

EVEN as from the Vitiatioⁿ of the Pancreatick Juyce, we have shewed that divers Functions are hurt; so from the same Fountain do we judge that various Effects may be derived: Amongst which we shall deservedly assigne the first and chiefest place to all Agues, and intermitting Feavours, because we judge the Accesses thereof to be ascribed to the Pancreatick Juyce, being stagnant in one or more of the lateral Ducts, by reason of an Obstruction made by Phlegme; and by reason of the force of the Acrimony increased, one while sooner, another while later, prepareth a passage for it self through the obstructing Pituity, then causing a vicious Effervescency in the Duodenum, and being translated to the Heart, produceth a preternatural pulse.

Which Opinion, seeing that hitherto it hath been known to few, to avoid confusion in the end of this little Book, we have set a part an entire Chapter, wherein we will treat of intermitting Feavers, to which we send the Reader, whilst in the mean time, we go forward to the other

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ther Diseases, springing from this more intemperate juyce.

It seems probable to us, that the cause of the Arthritis (or Gout) derives its original from the said acid Pancreatick Juice; namely, when its elevated acidity, either with Phlegme, or the Serum of the blood is carried to the joynts, and lyeth in them; the symptoms also concurring, seems to perswade the same thing to us; for those pains for the most part are wont both to invade, and be exasperated with a Paroxysme of a Feaver, but according to the diverse manner, wherewith the Bile and the intestinal Pituity are affected; so those paines of the Joynts do also manifest themselves after a diverse Mode, with the rest of the concomitant Symptoms.

The same thing is testified by the Urine, which once for curiosity sake, we tasted with Doctor *Roosendaël*, in which we found a notable Acidity. We have also observed (which seems not a little to confirm this our Opinion) in these Regions, that Wine, especially Renish, is exceedingly adverse to those who are obnoxious to this Distemper; the which we judge to happen from the same, because that Wine contains in it a greater acidity than other Wines.

That this more acid Pancreatick Juice doth increase Hunger, and stir up an insatiable, and Dog-like Appetite; few hereafter will doubt, who have considered diligently, that the Pancreatick Juice, and the sharp Exhalations

thereof do ascend even into the Stomach, as is manifest by the Sower Belchings, violently breaking forth, and sometimes by the Vomiting forth of Humours, more or less acid.

If they say that that juyce which is effused into the Intestine, the breadth of four Fingers below the Pylorus, cannot ascend through the Pylorus into the Stomach, it being naturally shut; we may also ask how the Bile (which by all is granted) may ascend to the Stomach, which issueth into the Intestine by the same passage: If they say it comes to pass by the inverted peristaltick Motion of the Intestines, we then say, that by the same Motion, the Pancreatick Juyce may also ascend, to which we shall adde that Exhalations do far more easily ascend into the Stomach than the Humours.

More acid Exhalations being excited, from the Pancreatick Juyce, through its Effervescency, and altogether with Flatulencies, carryed through the Venæ Lactæ to the Heart, and from thence to the Lungs, and there sticking, do not only cause a difficult Respiration, but also a dry Cough; the Confirmation of which, we have not only seen in the Hospital of *Leyden*, but else-where: For, in the dissecting of Dead Bodies, we have often found the Parenchyma of the Lungs, and its Vessels, as yet distended with Wind. If a Viscid Pituity accompanies those Windy Exhalations, and be detained in the Lungs, what doth it then produce

duce but the Species of an *Asthma*? But if those Exhalations, and Flatulencies, do tend further to the Head, the paines thereof will produce Alienation of the Mind, and sometimes infinite other Discommodities; every man may believe, That the Epileptick Invasions of Children, which they call *Stupens*, doth proceed from the said, *i. e.* the more Acid, Pancreatick Juyce, who Dutch. hath accurately attended to those Invasions, and the Symptomes accompanying them, and the way of Cure: For, besides that Acidity, which doth very often breath through the Mouth, they suffer the Gripings of the Belly; the Milk may likewise be perceived to be concremented, both upwards, and downwards; the Excrements of the belly are more Green, and give forth a sharp Odour: they are also cured by the tempering of Acidity: as for Example, with *Aqua Feniculi*, *Aqua Lilliorū*, *Conuallium*, *Spir. Salis Armoniaci*, &c.

The same, more Acid, Pancreatick Juyce, carryed to the blood, through the Lactean Veines, will give it a greater Consistency; whence the Blood, less Rarifying, will produce a lesser Pulse: From which, Vice highly exceeding, we judge a Syncope, sometimes to be produced, which is not a little confirmed by that Example which *Lazarus Riverius* relates in *Lib. VIII. Fol. 358.* of his Practice concerning that Syncope, which *P. Salius*, as he reports, *Lib. De Affect. Practic. Cap. IV.* observed in a Girl
of

of 14 Years of Age: Who, after a dayes suffering of Heaviness of the Head, Vertigo, and grievous Anxieties, the day following suddenly dyed: Afterwards her Body being dissected, the whole blood in the great Artery and the Vena Cava appeared to be Concreted, and so changed that it might intirely be drawn out from the Vein, and Artery, even as a Sword out of its Scabbard.

Concerning which thing, if any doubt, either by ours, or others Examples, let him take an acid Liquor, and pour it, by degrees, into the Vein of any Living Dog, and he shall not only observe the Blood, therein, to be so Coagulated, and Concreted, that the greater bloody Vessels may be transversely cut, without the Effusion of the blood; but also when the acid Liquor shall come in a notable Quantity, to the right Ventricle of the Heart, that it will presently extinguish, and kill the Dog. Also, no man will deny, that Convulsions, for the most part, proceed from an Internal Cause, from the Acrimony of Humours, irritating the Nerves, and causing, by a greater Influx of the animal Spirits, into the Muscles, Involuntary, and also Violent Motions: But when there is a two fold Acrimony of Humours, *viz.* Acid, and Salt, some perhaps may doubt, which of these do most frequently produce those Convulsive Motions: But, for as much as we can observe, they rather proceed from an acid Acrimony, than a Salt: because we see that Aromatick Medicaments; and those abounding with

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with a Volatile Salt, do very much conduce to their Cure; which would never come to pass, if they drew their Original from a Saline Acrimony. Besides, they are accompanied with such Symptomes, which are wont to be the Concomitants of Diseases, arising from an acid Acrimony: Yea, the Effects of Acids are allowed to be far more powerful, as is to be seen in *Helmont De Lithiasi. Cap. 9. Pag. 725. §. 71.* where he relates, that he saw a Chymist, which, after he had been much Conversant about making of *Aqua Regia*, he fell into the Palpitation of the Heart, Convulsions, and many other Incredible Dolours, by reason of the acid Exhalations, which mingled themselves with his Blood. From the same Acidity we stedfastly believe, That the Strangury is very often produced, seeing that, together with other Students, we have sometimes found the Urines of such as have laboured under the Strangury, in the Hospital of *Leyden*, to be Acid; and also seen the same Persons cured with such Medicines, as temper Acidity.

The which if you are minded to try, saith *Helmont, De Pleura Furente §. 14.* Whether or no the Strangury may not proceed from Acidity, mix some Drops at least of Sharp Wine, with the Urine, lately sent forth without pain, and inject it again by a Syringe, and you shall find, to your Pain, that what I say, is true. Also, that from the more acid Pancreatick Juyce, Ulcers do sometimes break forth in the Skin, corroding the same;

same, as also producing very great paines, they will not deny, who, following the Opinions of the Antients, determine them to arise from the *Atra-Bilis*; seeing that the *Atra-Bilis* of the Antients (as we have above Demonstrated) hath its Original from the more acid Pancreatick Juyce.

We are like-wise plainly perswaded, that the more acid Pancreatick Juyce, especially if it hath any Austerity conjoynd with it, produceth a greater astringency of the Belly.

For, if the Bile, by its Acrimony irritating the Guts (as is granted) may excite the Flux of the Belly, why may not that, which is contrary to such a Bile, produce a contrary Effect? Notwithstanding, if the belly be bound by a Viscid Matter, then we think, likewise, that a Flux may happen from the sharper Pancreatick Juyce, as it hath a power of inciding, and attenuating, the Viscid Pituity: From which it is manifest, that the Pancreatick Juyce, according to the Diversity of Humours, concurring with it, doth very often produce a diverse and contrary Effect; which thing we would have well noted, lest we should seem to contradict our self, in explicating the Effects of this juyce.

As yet we think, even as we seem to have already said, that the *Atra* and *Eruginous* Bile is excited from the more acid Pancreatick Juyce,, and a certain sharp Bile concurring; and consequently all Diseases, which Authors deduce

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deduce from them; and therefore they are not cured by other Medicaments, than those which are fit to correct the more acid Pancreatick Juyce. Which, as it is Consonant with Reason; so it will not appear Incredible to those, who will consider the things above spoken by us, with a more attentive Mind.

But perhaps some will say, after what manner doth the Pancreatick Juyce produe the *Atra-Bilis*, seeing that we have ascribed the Whitishness of the Chyle, after the Effervescency, in the thin Gut, to the acidity of the Pancreatick Juyce? To which we answer, That Acids, according to the Diversity of the matter where-with they are mixed, do also produce a divers Colour; for example, pour an acid Spirit to common Sulphur, dissolved in a Lixivium, and its red Colour will be changed into white. Antimony Calcind, with Nitre or Chalk, being boyl'd in Fountain-Water, and any acid thing, being affused to its clear Colature, will presently acquire a Saffron Colour.

A clear Infusion of Galls, mixed with the Solution of Vitriol, maketh Ink, to which, if you add the acid Spirit of Vitriol, that Ink will lose all its blackness, and become clear, like to Fountain-Water. The Blew Tincture of Violets, being mixed with Oyle of Vitriol, will wax into a Purple. The Wood Acanthus brought from *Brasile*, being infused in Common Water, doth freely yeld a red Tincture, which

which put to Distilled Vinegar, acquires a Colour like to White-Wine. A Knife, after it, hath cut a Pomecitron, in the Middle, unless it be wiped, and cleansed, from the Soure Juyce of the Citron, in a short time will be reduced to a nigrous Colour. And why from the same acidity too much exalted in Ulcers, the Cyrurgions Probe may not be stained with a certain Blackness, (as we have very often observed) and such Ulcers be happily cured by Temperating of the acidity, (as *Helmont* admonisheth *De Blase humano*, 9. 53. we leave to the judgment of others?

It may here suffice for us to have proved, that from one and the same acid, permixed with diverse things; one while a White, another a Black, another a Yellow, another a Purple, and so moreover other Colours may arise. He which desireth to excite many Colours in the Solution of Minerals and Vegetables endued with no Colour, let him go to that most curious Treatise which *D. Willis* hath written, concerning Fermentation, where pag. 88. *Edit. Ang.* he may find very many Mutations of Colours not unprofitable; and being about to assigne the Reason thereof, he saith in the following page: *If the reason of this Pheno-mena be enquired, it ought altogether to be deduced from those minute particles within the pores of every contained Liquor; which according to the scituation and position, being after a divers manner altered by the Infusion of another Liquor, do diversly transmit the beams of the light, and manifoldly break, or reflect*

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reflect it, and so cause the divers appearances of
Colours, &c.

Having now unfolded the Diseases risen from
the more acid Pancreatick Juyce, we seem in
our selves to hear some in short to ask the Que-
stion, from whence the acid Humour in the body
may proceed, if we do not use any acid things?
To which we answer, that we can in no wise
want those things which abound with an acidity.
For there is an acidity in the air, which appear-
eth, if the Caput Mortuum of Vitriol be ex-
posed to the air, which from the same elicith
a new acidity. Also, that the air is full of Ni-
trous particles, *Gassendus*, *Entius*, *Digbeu*,
and others, which professedly, or otherwise
ingeniously treat of this Matter, have proved:
But no man is ignorant, that Nitre containeth
in it self an acidity. There is also an acidity
inherent in Aliments: For in Kitchings, if flesh,
or other Aliments, begin to corrupt, their
Broth doth wax sower; yea, we have collected
an acid Spirit in quantity sufficiently large, from
the sweetest of Condiments, to wit, Sugar, by
chymical Art.

There is also an acidity inherent in Drink;
for Beer, or Ale, as also Wine, being left to
themselves, without the addition of any other
thing, do wax Soure: From whence, it is no
wonder, as *Hippocrates* witnesseth, *Lib. De*
Ket. Med. Text. 24. that there should be an
Acidity in Men. But, it being granted, that there
is an acid Humour in our Bodies, some one,
more desirous of Truth, may ask, How it
comes

comes to pass, that it doth not only corrode the parts of our Bodies, but also Copper, and Tinn, as we have shewed above? To this we shall also answer, That the Fermentations, continually happening in our Bodies, is sufficient for this thing: For, we daily see that by their help, many things are very sharp, which before were sweet, or at least Temperate: VWhether now this may happen by the Dissipation of the animal Spirits, or by reason of any other inward Cause, we leave to the Judgment of others. Likewise, Experience testifies, that Men, feeding upon a cold Diet, do sometimes, for the same Reason, and Cause, fall into burning Feavers.

We have also deservedly ascribed the Uterine Suffocation, or Mother-fits, so called, to the Pancreatick-juyce divers ways vitiated, but especially the Austere: The following Observation seems to give us no small light into the Truth of this Matter, which our Friend *Elfnerus*, in the Year 1667. sent to us from *Paris* to *Andegave*: We opened (saith he) a Maid, extinguished by the Suffocation of the Womb, in whose dead body we found nothing at all, to which death might be ascribed, but the blood coagulated in the Ventricles of the Heart, beyond the order of Nature. Which too much coagulation of the blood may not be deduced from any other cause, than from an acid Juycce, as we have sufficiently proved.

But the reason why we judge that this Effect is not produced by the Pancreatick Juycce, being

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ing simply acid, is, that all women which have a sharp Pancreatick Juyce, are not affected with that Disease: And therefore we do the more easily believe, that there is an austerity, or harsh Sowerness present with it; because we have known almost the like Disease excited from the Pancreatick Juyce, being austere, in a certain Bitch, as also in a Famous Man, the truth of which the following Testimony freely exhibiteth to us; done in the Year 1663. as it was communicated to me by the most expert Dr. Sylvius: *I tasted the Pancreatick Juyce, and found it (first) as it were Saltish; but afterwards, the Relish being some-what changed, it seemed then to be Sub-acid, with a light Austerity; There was such a Stink produced in my Mouth, that two of my Acquaintance, which were with us, admonished me concerning it: The Stink was like to that which riseth from Muddy, and stinking Water. My Mouth, and Jaws, were not only exsiccated, or dried, but also so constringed, that I seemed to be suffocated; which like thing, I suffer by a Disease familiar to me. And all these things vanished not suddainly, but remained, and endured for a while, till they left me by Degrees, and of their own Accord.*

The Bitch's Juyce was brought to the Famous Dr. Sylvius, and exhibited to his Taste, in our presence. From this, and the like Observations, it seemeth not absurd to assert, That Men may some-time be affected with a like Hysterick Suffocation; especially, when

its nearest Cause happens, not from the VVomb, but from the small Gut; in which, by reason of the Vitious Effervescency of concurring Humours excited, Exhalations, and austere Flatulencies are stirred up; which, as often as they arise through the Oesophagus, or Gullet, and come to the Arteria-Asperia, or Wind-Pipe, they so constrict those parts, that the Sick think themselves to be in the peril of Strangulation, or Choaking.

That divers Species of the Hypochondriack Affection may be produced by the said Pancreatick juyce divers ways vitiated, the Books of Practical Physitians do testifie, and the symptoms confirme. But that we stay no longer upon the more acid, and austere Pancreatick juyce, and the effects from them arising; we think fit to deduce at least one effect from the said juyce more Salt, imagine a serous Diarrhæa, which by its saline Acrimony, produceth a more violent, and more frequent peristaltick Motion of the Gutts.

These things being rightly considered, we doubt not but that by a diligent tract of time, by the Observation of those who happen to be conversant about the Sick, many effects will be made more manifest: And if there be more of Art in knowing than in curing Diseases, who sees not that this Pancreatick juyce being altogether known, the cure of many Diseases may be performed more easily, more speedily, and more

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more profitably. First of all in this Treatise, we have described the Diseases taking their Original from a more acia Pancreatick juyce, because they more often occur, and produce greater trouble, than those which derive their Original from this juyce by any other way vitiated, for the acid Humour excelling the rest, Witness *Hippoc. lib. de Vet. Med. Text. 42. 14.* of all others is the most Incommodious.

I 2

CHAP.

C H A P. X.

How the vitiated Pancreatick Juyce may be Corrected.

Seeing that it is not sufficient to have said in what manner the Pancreatick Juyce may offend, Namely, by exercising too great an Acidity, Salitude, and Amaritude; we have not restored it, saith *Hyppocrates*, before that the same be purged, and overthrown by the admixing of other things, *Lib. de vet. Med. Text 34.*

But with what Medicaments the Vices of the Pancreatick Juyce, above declared, may more easily be tempered, or evacuated we shall now handle in brief.

The more sparing Separation, or Excretion, of the Pancreatick Juyce, happening by reason of Viscidity, will be cured by Medicines, correcting any Viscidity; such are Volatile Acids, as also Salts, as well Volatile as Fixt; especially the Volatile Salt of Amber seems to agree with our business; which, besides the Volatile Salt, also contains certain Acid Particles: But, as often as the Pancreatick Juyce is thought to be less acid, then use pure Acids; on the contrary, as often as the Acidity thereof exceeds, then Salts are most conducibile.

VWhen

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When the Excretion of the Pancreatick Juyce is more sparing, by reason of an Obstruction happening in one or more of the Lateral Ducts, the Medicines, but now spoken of, are also profitable; for, except they loosen, cleanse, and cast forth the Obstructing Pituity, or Remedy the Viscous Crudity of the Blood, they will certainly profit nothing, as we shall endeavour, more largely, to explain the same in the subsequent Chapter, when we shall treat of intermitting Feavers.

The more Copious Increase of the Pancreatick Juyce, will be Cured, as well by abstaining from much Drink, especially such as is sharp; also by using such Medicaments as may expel it from the body by the belly; as also Sweats, and Urines. But, among such Medicaments, as educe it by the Belly, such as Purge-Water, are convenient above others; by help whereof, the Serous Humours are purged, more than the Bilious: which, some years since, we have observed in not a few Dogs, to whom we exhibited, as well Hydragogues as Cholagogues; and, seeing that they excellently deponed the belly, we suddenly opened the Abdomen, at the very time of purgation; the Dog's as yet living; which done, we could observe, although difficultly, in those to whom we had given a Cholagogue, *viz.* one Dram of Diagredium, that the Bile did flow in a far greater Quantity, from the Intestinal biliar Duct; but in another, to whom we had exhibited a Hydragogue, namely, of Powder

of Jallap two Drams, we observed that the Pancreatick Juyce did break forth in a large Quantity, from its Ductus into the Intestines, although then the Bile also did issue forth in a great Quantity; and in another, to whom we had given a Cholagogue, the Pancreatick Juyce did also flow forth in a greater Quantity, than usuall; nevertheless we are able to collect, that the Bile is far more Copiously purged by Cholagogues, and the Pancreatick Juyce by Hydragogues.

In these Experiments, performed other things, did yet occur, worthy of note; for first of all, at the very time of purgation, there was nothing deposited through the Meseraick Arteries into the Cavity of the Intestines; but what so ever of a Liquid matter remained in them, after expression, was sucked up by the Venæ Lactææ, or Meseraick Veines. Secondly, That those Ducts, in whom the Lactean Veines appeared not: After 3. or 4. Hours Exhibition of Aliment, we cut the Abdomen in them; neither the Bile, nor the Pancreatick Juyce, was carryed to the Intestine, in a more than usual Quantity. Concerning which, seeing that other things, as yet remain to be spoken to, we shall defer it to another occasion, untill by many Experiments, more surely made, we shall more perfectly (also) understand the force of other Medicaments. The Pancreatick Juyce, over Fluid, will be corrected by the prudent assumption of Viscid Aliments; such are Pills of Hound's Tongue,

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Tongue, and other things which in-
cras-
late.

In reference to the Qualities of the Pancreatick Juycce, perceptible to the tast, if it offends by too much Acidity, Austerity, or Salsity, it will be cured, *First*, With altering Medicines, as *Hippocrates* hath rightly taught us, *De Vet. Med. Tex.* 31.20. where he saith: *And I perceive all other Fluxes, which happen by reason of the Acrimony, and Intemperances of Humours, are restored by their tempering and Costing..* But that will easily be absolved by the Administration of the Medicines, even now spoken of.

The more Acid Pancreatick Juycce will be cured, *First*, With a pure Volatile Salt, as an Aromatick, by tempering the same.

Secondly, It will be cured with a Lixivious Salt, as well fixed as Volatile, by infringing its Power.

Thirdly, It will be cured by Crabs Eyes, Coralls, Chalk, Shells, especially being Calcined, fileings of Steel, and the like, by concentrating it.

Fourthly. It will be cured, by Oleous Emulsions, as also, by diverse Oyles, made as well by expression, as Distillation, as it were Wrapping about it, and Blunting the Edge thereof. [I know not how to render *Obvoluo* and *Obtundo* better].

Fifthly. It will be cured with water, & watery things, washing and weakning it. But here no Purges are to be exhibited; because, hitherto,

to, none are known; which, without great difficulty, do educe the Acid Humours, not tempered; so that, *Aphorisme of Hippoc. 22. Sect. 11.* which saith, *Things cocted not crude, being brought forth by a Purging Medicine, are not crude in their beginning, unless they swell: But many do not swell;* doth rightly here take place. The austere Pancreatick Juyce will be cured by Volatile Salts, as first, by the Distilled Spirit of Salt *Ammoniac*, after the addition of Salt of Tartar, and Water; to which also, may be referred Castor, and its Tincture.

The Salt Pancreatick Juyce, and a Diarrhæa, from thence arising, may be cured by the *Dia-cordium of Fracastorius*, Pills of Hound's Tongue, Coralls, burnt Hart's horn, Bezoar-Stone, and other things Incrassating, and also Concentrating Saltitude.

C H A P. XI.

The History of Agues, or Intermitting Feavers.

BECAUSE we have before promised, in the Ninth Chapter, that we would, in this place, demonstrate, that Intermitting Feavers have their Original from the Preternatural Disposition of the said Pancreatick Juyce, we cannot but annex their History; not because, the difficulty of Explicating these Feavers, is obscure to us, nor shunneth none of the most Expert Physitians; So as, hither-to, they have not satisfied the Curious in their Explications: So that, being by most passed over with a dry Foot, they have left behind them a Series of innumerable Difficulties; but, because we judge it to be a thing of so great moment, that as many as hither-to have given themselves to the search of Intermitting Feavers, have still desired to this Labour, the further Industry of other Learned Men: For, very many Diseases do every day occur in our Practice, wherein that Feaver either proceedeth, is concomitant, or doth follow; So that, sometimes it requireth an intire Method of Curation, for it self.

Which

Which, seeing it is so, we think our Cogitations, and Experiments, not to be ingrateful to the Curious Searchers of Nature, especially if we hold their minds not long in suspension, by rehearsing the Sentences and Opinions of many Authors, as they ordinarily have done, who have gone before us, in the same kind of Study: or retain those things, by shewing an intire Series of Questions, relating more to Curiosity, than to the necessity of the thing to be known; but we shall presently expound, in a few words, as much as is possible, those things which we judge concerning this matter.

Seeing that *Aristotle* hath rightly said, *Lib. 2. Physic. Cap. 13. That there can be a sure Knowledge of nothing, the Cause, or Original whereof, is not known*: We, contrary to the Common Order, shall endeavour to pursue the Nature of Intermittent Feavers, by searching out their Signes and Causes.

Seeing that all Physitians, which have hitherto written of Intermittent Feavers, cry out that their Pathognomick Signe is a more Frequent, and Preternatural Pulse; to know the Nature, altogether of Intermittent Feavers, by searching into the Causes of the Pulse, we judge with the never sufficiently praised *Fran. de le Boe - Sylvius*, that the Cause of a more Preternatural Pulse, is either (first) the too much, and Permanent Rarefaction of the Blood, arising from a more Potent Fire, breaking forth from the Effervescency of both Bloods.

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Bloods. Or, *Secondly*, because of any sharpness, being at one time Acid, at another Lixivious, another while brinishly Salt, driven through the Veines, with the Blood, to the Heart, and Internally gnawing the Parenchyma of the Heart. Or, *Thirdly*, something halituously Flatulent, and like-wise carried with the Blood to the Heart, or excited, by the Effervescency, in the Heart; and increasing the Explication of the Ventricles of the Heart. Or, *Fourthly*, something sharp, or hard, either in the Peri-cardium, or else-where existing, and externally gnawing, or pricking the Heart.

These few things being premised, there is none but may see, that the cause of continual Feavers, is continually carried to the Heart, but the cause of Intermitents by Inter-vals. It is not our purpose here to speak of Continual Feavers, those that are desirous of searching out, and knowing of the Nature of those, we recommend them to the Practice of Dr. Sylvius, where, amongst other things, accurately delivered, they may find the exact Description of those Feavers, Chap. 29. Pag. 407. And we, in the mean-time, being about to deliver the Description of Intermitting Feavers, shall say, That such a Focus, or Minera, of Intermitting Feavers, is required, which is apt to transmit the cause of a more frequent, and Preternatural Pulse, by Inter-vals, to the Heart.

Sundry

Sundry men have sought this Minera, in diverse parts of the Body; some have imagined they have found it in the Mass of Blood, which, to some others seemed less true, to whom the Continual Motion of the Blood, was known; because the Circulation of the Blood is performed once, twice, or four times a day: For, the most accurate Dr. Lower, in his Treatise of the Heart, Fol. 156. proveth, *That the Blood of a Man, well disposed, circulateth through the Heart, in the space of one Hour, thirty times*: But being granted, (which in no wise, may be denied) that the Mass of Blood, of the whole body at least, sometimes in a Day, doth flow back to the Heart; part of which, if evilly affected, as often as it transitteth the Heart, would produce a Fit of a Feaver; and so, from the Blood naturally following, neither a Tertian, or a Quartan Feaver may be deduced, unless they say that the Blood doth absolve this Tragedy, being preternaturally detained in any part of the body; which like-wise, doth not alike appear to those, to whom it is known, how easily the Volatile Spirits exhale, by the Detention of the blood, and the remaining Particles of the blood being made more sharp, do suddenly excite, mutually, among themselves, a Heat and Inflammation of the Part; to which, if an Aposteme be subjoyned that will affect the Blood, passing through its Circuits continually, and not by Intervals: Whence if a Feaver follows, it ought not to be called

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led an Intermitting, but a Continuall Feaver.

If they say that the obstruction is not expected to the generation of intermitting Feavers, but to furnish the phlegme which is of that nature that daily, the yellow Bile wch. every third day, and the Atra-bile which every fourth day may produce a certain ebullition: many of a higher ingenuity, may ask first whether or no those humours such as they are described in the Schools can be Demonstrated to be in the mass of Blood, seeing it is evident by what is already said the Atrabilis derives its original from the yellow Bile, and more acid pancreatick Juyce. Secondly, how doth that seem probable that a humour more cold, tenacious, and unapt for motion, as phlegme, daily, and a hot humour being more fluid and being fit for motion as yellow Choler, should every other day onely excite a feaverish Ebullition in the Blood; *Thirdly*, how intermitting Feavers may be changed from quotidian into tertians, quartans, and the contrary. *Fourthly*, to what humours they can ascribe Quintans, sextans, or those which have more seldome periods (of which *Fernelius* lib. 4. cap. 14.) if they determine that each Feavour draws its Original from a certain peculiar Humour.

But they which have held the minera of intermitting Feavers to be latent in some part of the Body, have most of them sought it in the Abdomen; for nauseousness, loathing of Food, Torments, Colds, Horrors, Rigors, and other
pre-

preludiums of the fits conspicuous to none but such as are more attentively disposed, do shew the Abdomen to be evilly habited. A vomiting excited either by Nature or Art, and very often, presently asswaging the fierceness of the fits, sheweth the principal ways or passages thereof to be evilly habited. The Cure itself of the Abdomen also in the beginning of the access declareth the same according to *Fernelius de sede intermittentium lib. 4. cap. 10.* for Fomentations applied to the Hypochondriacs procure a remission of horror, rigor, and other Symptomes.

But what part of the Abdomen in these Feavers is evilly affected, hath wearied the brains of many; for so confusedly have they sought their minera, that nothing of certainty can be concluded from their writings or opinions; for some have sought it in the miseraick Veines, some in the Branches of the vena porta between the Liver and the Spleen, some in other Vessels, yea also in the great Colon, the duplicature of the Omentum which is under the ventricle, and in innumerable other things have they determined the focus of intermitting Feavers, whose Clouds of falsity in these our more happy times the sun of Truth hath so discussed and dissipated, that they want not our improvement. Therefore least we consume our own, and the Readers time, by writing more things obvious as well in the Books of the Ancients as in the Moderns, we shall willingly pass them by: Seeing that the cause of all intermit-

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ting Feavours seemes to us to be contained in the pancreas alone.

The reason of this Opinion is this, that having considered the parts of the whole Body of man, which by intervals only may transnit the Cause of these Feavers to the heart, none can be found in the whole body to which not only the Focus of intermitting Feavers, but also the causes of all their symptomes may be imputed besides the Pancreas.

But some perhaps may say, that heat, thirst, ulcers, breaking forth in the lips of the Feaverish, bitter Vomitings, Cholerick Excrements, and other symtomes wont to accompany tertian Feavers do declare the bile to be primarily offended, wherefore the Cause of all intermitting Feavers ought not to be ascribed to the pancreas alone.

But truly this objection will fall of its own accord, those things being known which we shall speak of in the following Discourse concerning the Reasons of divers Symptomes; for we know that in tertians the bile is very often predominant, but it is to be noted that its abundance doth not cause an intermitting Feaver; because that is perceived after it hath excited a vitious Effervescency by intervals with the pancreatick Juice, in which if the bile gets Dominion, the signs thereof even now declared do sometimes manifest themselves; but because this Effervescency proceeds from the pancreatick Juice preternaturally disposed, that Feaver is not ascribed to the Bile, but to the Pancreatick

tick Juyce, as, by the Sequel, shall more plainly appear. We judge the cause of Intermitting Feavers to be an Obstruction, made in one or more of the Lateral Ducts; because of Pituity, carryed thither in too large a quantity, and there detained: VVhich thing seems to us to happen for the following Reason; to wit, For as much, as the Pituity, of the thin Guts, especially that sticking to the sides, lest they should be hurt by the abounding Humours, being in too great a quantity, by reason of the immoderate Exercises of the Body, and perhaps by an over-much use of hot Aliments, or by some Error, committed in the six Non-Naturals, is dissolved, and with other Humours, carryed to the Heart, by the Milky Veines: From whence, by the Order of Circulation, this Phlegmatick Matter, together with the rest of the Blood, is driven to the Pancreas; and being separated in its Glandules, with the Pancreatick Juyce, it enters the Lateral Ducts of the Pancreas, in which, either by the External Cold, or of that Bowel it concreteth, and is Coagulated; by which reason, it obstructeth either one or more of the Laterall Ducts.

VVe think the accesles of intermitting Feavers, ought to be ascribed to the Pancreatick Juyce, stagnant in one or more of the Lateral Ducts, by reason of an Obstruction; and one while sooner, another while later, preparing a way for it self, through the Obstructing Phlegme, by its Acrimony increased; and not
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only causing a Vitious Effervescency in the small Gut; but being every way carryed, especially to the Heart, produceth a more frequent, and preternatural Pulse.

Which, that it may more clearly appear, we shall spend a little time in the unfolding thereof.

That Coagulation, which we have mentioned to happen in the Pancreatick Juyce, we have some-time observed in a Dog, whose Juyce we endeavoured to collect in the Winter time; which, by the cold of the Ambient Air, was so thickned, that only a little would flow forth, and of a gross Consistency, untill the Dog, being placed before the Fire, between two Pillows began to grow hot; from whence the Pancreatick Juyce did flow more Fluid, and more Copiously. We have observed, that the Coagulation of the Pancreatick Juyce hath excited Obstructions, in the Lateral Ducts, of the Pancreas, as in the Year 1663, with the Famous Dr. *Sylvius*, in a certain Woman, labouring under an intermitting Feaver, into whose Ductus Pancreaticus, after Death, we injected, by a Syringe, a very Volatile blewish Liquor; which, out of the great Duct, into which it was cast, did penetrate into most of the Lateral Ducts, whilst in a few, although more near to the Intestinal great Duct, by reason of an Obstruction, it was stopped: From whence, by the said Colour, the Substance of the Pancreas it self, was tinged in one place, and not in another.

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The Pancreatick Juyce, being stagnant in one or more of the Lateral Ducts, by reason of an Obstruction, by its delay becometh more sharp, and at length, perforating the Obstructing Phlegme, prepareth it self a passage, through the Obstruction, into the common or middle Duct, until all the detained Juyce, being effused, the Phlegme as yet adhering to the sides of the Duct, grows together again, and by its mutual Reunion, renews the Obstruction: Whence at length, the Pancreatick Juyce is Collected for the following Fit; which again, by its delay, being made more sharp, doth again perforate the Obstructing Pituity, and produceth a new Paroxysme; which Fits, return alwayes at the same time, as often as the Pituity, causing the Obstruction, doth occur, in the same Quantity, and Viscidity, with the Pancreatick Juyce, of the same Acidity, and Acrimony.

The Pancreatick Juyce is made more sharp by Stagnation, in as much, as the Animal Spirits do not so straightly embrace it, but leave it obstructing: Hence therefore, by the dissipated Spirits, wont to attemper it, there redounds a greater Acidity of the Pancreatick Juyce. Would you have a Simillitude? We will grant it: New Ale, included in Hogsheads, Whether or no, by a certain delay, it doth not lose its Sweetness? Consider, that all Wine turns to Vinegar, the Spirits being dissipated; also that Vinegar it self, by delay, is made more sharp. For,

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For, every heat, dissipating the Animal Spirits, causeth every sharp thing to be more sharp: So that, it ought to seem strange to none, if we say, that the Pancreatick Juyce, by stagnation, deserteth its genuine Disposition, and passeth into a more acid Acrimony. But the Pancreatick Juyce, being made more sharp by stagnation, and effused into the thin Gut, with the Flegmme and Bile, stirs up a vitious Effervescency; and indeed, by reason of such a Pancreatick Juyce, stretchings, yawnings, and horrors are produced, and every - where a sence of Cold, especially in the Region of the Loynes, in which the Fit begins. Neither is that first called a Feaver, which either the Pancreatick Juyce, it self, vitiously Effervescing in the small Gut; or at least, Exhalations from thence arising, and at length, carryed to the right Ventricle of the Heart; and, after a certain manner, irritating it to a more frequent Contraction of it self. But we judge that the Pancreatick Juyce, by its acid Acrimony, performs this thing; although nothing hinders, but that something of a Saline Acrimony, arising from the Bile may concur: because we daily observe, that Exhalations do ascend in the Effervescency, between Acids and Salts; which, being moved to the Nose, by its Acrimony, causeth Offence. Intermitting Feavers by the reason already given, proceeding from the Pancreatick Juyce, are divided into Simple, and Compound; the Simple, by reason of their Fits, returning at divers times, are distinguish-

shed into Quotidians which daily, Tertians which every other day, & Quartans which on the fourth day, Quintans which on the fifth, &c. do return.

Those are called Compound which excite divers fits in one and the same sick person, and they are either of the same Species: as double quotidians, double or treble tertians, double or treble quartans, &c. Or they are of a divers Species, as a Quotidian with a Tertian, a Tertian with a Quartan, &c. We shall say nothing in this place concerning those Feavers which are compounded of intermittents and continual, tho we know they are daily to be observed by practitioners; for he which hath known & inspected the Nature of intermitting and continual Feavers, may consider that this complication carries nothing of difficulty to our Opinion, which is clearer than the Meridian Light. They are also distinguished by reason of an urgent cold, and heat into cold, and burning Feavers; although for the most part the cold is wont to go before, and the heat to follow, *Vanhelmont* in his Treatise of Feavers Chap. I. §. 5. Writes that the sick are sometimes troubled with cold alone, and experience also witnesseth the same.

Hence unless we be egregiously Deceived, we may infer with the surest Foundation, that the essence of Feavers consists not in heat (as many lead by speculation, more than by the verity of the matter, do boldly maintain) because then heat would be allways present with the Feaver: neither could the Feaver be existent without heat, which nevertheless, they

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they do, or may observe daily, who least of all attend to the practise of Physick, do but visit the sick: I say they may observe in the beginning of most intermitting Feavers, when the bodies of the sick are terrified and shaken with cold, that cold alone is troublesome. Nevertheless, lest it should seem a new and unheard of thing, which we speak, that the Essence of Feavers doth not consist in heat, besides experience, we shall bring the Authority of *Hypocrates* which seems to teach the same thing *lib. De Vet. Med. Text. 30. 7.* where he saith:

I think this to be the greatest sign that men do fall into Feavers not simply because of heat, neither is this simply the Cause of the affliction; but it is bitter and hot, and hot and acid, and salt and hot, and infinite other things; and again cold conjoyn'd with other faculties. These therefore are the things which hurt, &c.

But if any one notwithstanding be so captivated to his prejudices, that he denies a trembling and a horreur to be the beginning of intermitting Feavers, let him also perswade himself, as he must, that those who at the time of that cold do die (as others have often seen, and our self also within this eight days) expire without a feaver; which nevertheless to men conversant in Physick, will seem no less false than ridiculous.

Perhaps no man will deny that in some feavers, tertians especially, no Cold being perceived, and by reason of heat alone continually urging at the time of the fits, they may be called

led burning feavers, and although any through a desire of Contradiction should deny that burning, such feavers will not therefore cease to be observed.

Forasmuch as no feaver makes its progress alone, but for the most part is accompanied with divers symptomes, some of which do torment the sick no less than the feaver it self, they are distinguished, or at leastwise may be according to the diversity of symptomes manifesting themselves with each fit into Syncopals, Hystericks, Colical, Raving, Greedy, Astmatical, Arthritical, Catharral, Emeticks, Catharticks, Salivals, &c. If any demand a Reason, why the fits return one while daily, another every third day, another every fourth or fifth day, and that so certain as the hand of a Dial goes not more exactly? We shall say that all the diversity depends, partly upon the diversity of obstructing phlegm, partly that of the stagnant Pancreatick Juice, for as there is found in the lateral Duct obstructed more or less pituity, and as it is more or less viscid, and the Pancreatick Juice more or less sharp, so the pituity causing the obstruction, will sooner or later be perforated by the Pancreatick juice being made sharp by stagnation.

And although the beginnings of fits mutually following one another, are not always distant 24. 48. or 72. houres; but sometimes 18, sometimes 24, sometimes 30, sometimes 36, and 40 Houres, &c. Nevertheless Physicians are wont to distinguish the fits according

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to daies; so that by quotidians they intend not only those which return every 24. houres, but these also which make their accesses in 18. yea, 30 houres; the former of which they call Antiponents or going before, the later post-ponents. [which word is generally understood] So those fits which return every 48. houres are truly esteemed for tertians, but not those only; for they also which are returned every 36. or 40. houres are called tertians, but anteponents, as also those which are repeated every 50. 55. or 60. houres are called Tertians, and likewise Post-ponents.

The Cause of this inequallity of the fits, seems to us to proceed from the obstructing phlegme being more or less viscid, or the whole Pancreatick Juice more or less sharp, and that by reason of the diverse use of the six Non-naturals.

By this reason it is not difficult to us to unfold how Quotidian feavers are changed into Tertians, and Tertians into Quartans, Quartans into Quintans, and the contrary; which thing they find very difficult, who determine that Quotidians arise from Phlegme, Tertians from Yellow Choler, and Quartans from Melancholy.

The Fits return so long, as the obstructing Pituity is not totally removed from the Duct, but remaining therein is again compelled to renew the Obstruction; But when the Viscid Phlegme, either of its own accord, or by art, is so evacuated, that nothing thereof remains,

which may be joyned together, whereby the obstruction may be renewed; then also the Feavers are Cured. But as often as only one of the Lateral Ducts is obstructed, so often is one, and indeed a simple Feaver, produced. But as often, as many of the Lateral Ducts are obstructed together, so often are many, and manifold Compound Feavers produced; which are either of the same, or of a diverse Species: Obstructions are of the same Species, when they are of the same Nature, and Pertinancy, in diverse Ducts of the same Magnitude. Obstructions are of a diverse Species, when they are of a diverse Nature, and Pertinancy, in diverse Ducts, in like manner differing from one another in Magnitude. We say in diverse Ducts of the same, or a diverse Magnitude, seeing that as often as the Obstruction ariseth from a like Pituity, in diverse Ducts, of the same Magnitude, and Amplitude: So often the Pancreatick Juyce, being made sharp by stagnation, will, in an equal space of time, perforate the obstructing Pituity; and also, in an equal space of time, will produce the Fit: But as often as Ducts, of a different Magnitude, and Amplitude, are equally obstructed by a Viscid Phlegme, so often shall we see a Diversity in the Fits; in as much, as it may sooner, and more amply, wax sharp, in one Duct, and thence the Fit may sooner return, and more grievously afflict than in another; or as often as obstructions do happen in Ducts, of the same Magnitude, from a Pituity, not
alike

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alike Viscid; so often, like-wise, may the Fits invade the Sick at divers times; for as much as the Pancreatick Juyce, equally waxing sharp, will sooner perforate the less viscid pituity, than that which hath a greater Viscidity.

From those things, which we have now propounded, it will not be difficult to explain, How in a double Tertian, or other Compound Feavers, one Fit may, unexpectedly, come in an Hour or two, after another: For, the obstructions may happen in Ducts of the same Magnitude, from a Pituity alike Viscid; so that, one obstruction may be excited the first Hour, and another the fourth Hour; the which, if in Tertians, (unless some fault, as we have said, be committed in the six Non naturals) the first will again return on the third day, the first hour, and the second at the fourth Hour, &c. Which, in our judgement, affords no small difficulty to those who hold, that Intermitting Feavers, are brought to a Turgescency, by Congestion, from an evil habit of the Blood, or of the Alimentary Juyce, depraved: as for example, seeing that the Alimentary Juyce, depraved, doth excite, by its Turgescency, a feaverish Effervescency in the Blood, in the first Hour, Why may not that Quantity of the (depraved) Alimentary Juyce, serving to produce another Fit, which like-wise begins to swell, in the same Blood, being in the same Effervescency, be enkindled, and consumed? Truly, we favour not that Opinion; neither

neither also, can wee conceive how, in those which are fasting, the Feaverish Fits so often, beyond measure, could be returned at the same time.

From what hath been said, the reason is also manifest, wherefore in a double Tertian, or Quartane, &c. the fit doth precisely anticipate, or succeed, an Hour; no other-wise, than as they arise from one, and the same, Lateral Duct: For, as the whole Pancreatick Juyce, and the obstructing Pituity of both, grows more or less sharp; also, the Pituity of both, more or less Viscid: the Fits of both do equally return sooner or later. There are Feavers, whose Species by some, are difficultly distinguished; as for example, a Quotidian, from a double Tertian, or Triple Quartan; for, of those three Feavers, each daily excite one Fit; which distinction, nevertheless creates no trouble to such as are attentive to the matter: For, a Quotidian doth ordinarily invade the Sick, either at one Hour, or equally sooner, or later. The double Tertian, for the most part, so hath its Fits, that the first access answers to the third, and the second to the fourth, &c. But in a Triple Quartan, the first Fit answereth to the fourth, and the second to the fifth, &c.

Which things being rightly Considered, every one may easily distinguish these Feavers, mutually from one another, unless some external fault disturb the order or frame of the Body, either

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either in whole or in part. The diversity of those Symptomes so variously occurring, doth not overthrow those things which we have propounded concerning intermitting Feavers, especially of heat and cold seeing that diversity dependeth upon a diverse Constitution, of the rest of the Humours existent in the Body. For otherwise a fit of a tertian Feaver, happening to a Body replenished with much Bile, and that sufficiently sharp, would last far longer than a fit happening to that Body where but little bile, and that as yet temperate is remaining. Also a greater or lesser quantity of phlegme, as likewise plenty of other humours abounding in the body, may not a little augment this diversity.

But because it may not suffice to have said, that the primary Symptomes of intermitting Feavers are heat and cold, it behoveth that we here also, annex our Opinion concerning their Cause and Original. We Judge that the cold of intermitting Feavers, draws its Original from the more acid Pancreatick Juice, and heat especially from a more acrimonious Bile; the former is evinced by the assumption of acid things, as *Galen* proveth in a thousand places from things helping and hurting, that acids are cold, and do produce cold, and that not only in the sick, but also in the sound; in which sometimes we see alike Cold to have been excited, as those which are feaverish are wont to suffer, and any one may observe, if acids be taken by those which are feaverish in the time of the cold fit, that

that the feaverish cold will be encreased after a wonderful manner. He that refuseth to believe these our observations, let him read *Galen De Simp. Med. Facult.* where he saith: *Every Acid, as it is only acid, is plainly cold; whether it be a Pear or an Apple, the Juice of Grapes or Rasberies, or Mulberies, punick Apples, or any other Fruit, or Juice, or Plants, as sharp pointed Dock or Sorrel; for that it appears to the tast that there is a vehement Acidity inherent in it, neither may any thing be prefer'd before it; for its Acrimony, you shall find this Juice altogether cooling, &c.* as also in the same Book *Cap. 7.* and in infinite other places he teacheth, that Acids are cold, and produce cold in our Bodies.

That the qualities of Humours are to be known by their effects, *Hypocrates Lib. De Vet. Med. Text. 39. 5.* doth diligently inculcate: Know that the chief Forces of Humours is in their acid Faculty; which likewise in the 23. of the same, from manifest things which behoveth to be Learned without the Body, he manifestly teacheth. Moreover, *Lib. de Locis in Homine Text 56. 10.* He saith, that Acids are also pituitous, which in *Lib. de Natura Humana Text. 12. 2.* He manifestly declares to be most cold of all things existing in the Bodie: The which, unless it were true, untowardly would *Galen* in his whole Book concerning Food in acute Diseases, and those who are his diligent followers, prescribe an acid medicamentous Diet, in acute Feavers.

Although

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Although no man perhaps can easily deny, heat to proceed from the Bile, in regard we see that our natural heat is much augmented by the assumption of bitter, and aromatick Aliments and Sauces, augmenting Choler and making it more sharp. Besides, both is proved by the Remedies exhibited, diminishing or taking away those Symptomes; For we see clearly, that by medicines infringing the Acidity, the Cold is tempered and taken away; and we likewise observe that by medicines tempering the Bile, especially Acids, the heat is lessened, as we shall presently in many things further Demonstrate.

From whence every one may easily imagine the Reason, why for the most part the fits of intermitting Feavers, are begun with a sence of Cold, and terminated with heat: For the Pancreatick Juice being made more sharp by stagnation in one or more of the lateral Ducts; after which flowing into the thin Gut, there excite such an effervescency with the Bile, wherein the *Succus Pancreaticus* by its predominant Acidity every way emits or sends forth acid Exhalations, affected with a sence of Cold; which when they touch the Gall-bladder by their acrimony provoke it to its Contraction, from whence the Bile breaking forth into the Intestine, in a more than usual quantity overwhelmes the Pancreatick Juice, and raiseth therewith such an Effervescency, in which the Bile predominating Excites heat, by sending every way its exhalations or Emissaries.

That

This our Opinion, is in a wonderful manner confirmed by the Vomitings, which very often happen to the Sick, at one time so cold and Acid, that bringeth a stupor to the Teeth; and again on the contrary, another while so hot and bitter, that they believe they Vomit nothing but pure Choler.

But some perhaps may ask, why we deduce Vomitings and acid belchings, rather from the Pancreas, than from the Stomach? We answer, because it is agreeable to experience, that the Pancreatick Juice is Acid, and seeing that the searchers of Nature, do as yet dispute concerning the ferment of the Stomach and its Generation, we judged that it ought to be determined, rather from a certain than an uncertain Cause: And if it shall be evinced by further search in the stomach of Men (we speak not of Birds who require a stronger fermentation to digest Stones and other things of a hard consistency for the Generation of Shells) that any other ferment is generated, besides the Spittle continually swallowed, and that to be Acid, then shall we be so much the better able to prove an Effervescency to be excited in the thin Gut, between the Bile, and the Pancreatick Juice: Seeing that the Temperate, or Natural Acidity of the Pancreatick Juice, would be helped by the acid Ferment of the Stomach; and from thence, the Effervescency would be the more powerfully performed.

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It is further proved, that the Acidity, cast forth by Vomitting, doth not proceed from the Stomach, but from the Intestines, by Vomitories, exhibited out of the time of the Fit; by the help whereof, first an insipid Matter, afterwards, by further straining, an Acid, and Bilious Matter, is vomitted up; the contrary of which would happen, if the Soure, and Cholerick Matter, did proceed from the Stomach. Concerning the manner by which Acids may get to the Stomach, no man, of a sound mind, will doubt, who determines the Bile, ejected by Vomiting, to proceed from the Intestines: Seeing that the Pancreatick Juyce may, and ought to be driven through the same wayes, as the Bile, flowing to the Intestines, by their inverted Peristaltick Motion, with the same ease to the Ventricle, as we have above demonstrated.

Neither doth the place a little confirm this our Opinion, in which, a Feaverish fit beginning, is for the most part perceived Cold, then Hot; as also, a most fierce pain: We understand the Region of the Loynes, in which the first part of the thin Gut lies, under the Mesentery, as is to be seen *Tab. 1.* wherein the Conflux and Effervescency of the Bile, and the Pancreatick Juyce, is Celebrated; from which, the Particles of those Humours, being agitated upon the Ligaments of the Mesentery, and other Nervous, and Membranous parts, they dash against them, with an Impetuous force: So that, that Effervescency may sometimes

times be perceived by the Touch in the Sick, as we have above demonstrated. Nor does the Pancreatick Juyce, being made sharp by stagnation, only exercise a tyranny, in the Region of the Loynes; but also sends forth its acid Exhalations, both upwards and downwards; Who doubteth that from the one the Torments of the Belly, and from the other Acid belchings, do proceed? But if those Exhalations penetrate through the Venæ Lactææ, to the Heart, by Incrassating the Blood, gives an occasion of a lesser Pulse; which, nevertheless, by its corroding Acrimony, produceth one more frequent. The Acid Exhalations, being subdued in manner afore-said, Salt and Biliuous Exhalations do follow; which again, by attenuating the Blood, do no less excite a great, and sometimes also, a more frequent Pulse, by irritating the Heart; and that so long till their Acrimony being spent, they can no longer irritate, or provoke the Heart: Which done, the Vigour and Natural pulse of the Heart is returned: So that, very often the most skilful can hardly judge, whether they have a Feaver or no.

We will not here speak (lest this Chapter should swell too much, with that which we purposed to finish in few Words) concerning six Hundred other Symptomes, which are wont to accompany Intermitting Feavers; seeing we are perswaded there are none, at least, of those who with an attent mind, have considered, that the Juyce, or its Emissaries, after a
divers

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diverse manner disposed, doth perambulate the whole Body, and may produce diverse Symptomes; but may, from these things, deduce them by their own proper Industry.

Which seeing it is so, we leaving those small Circumstances, shall rightly pass on to the Cure of intermitting Feavers, which as it Primarily consisteth in taking away Obstructions, and correcting the Pancreatick Juice, and other Humours if they be Vitious; so it may be most succesfully performed, first by Medicines inciding and attenuating tough Phlegme, and sometimes expelling it from the Body.

Secondly, By adhibiting Remedies, which are indued with a force of correcting and temperating the Pancreatick Juice, offending by its Acrimony.

Thirdly, By correcting other Humours in the Body, this or that way so peccant that they may Cherish the Vicious Effervescency excited in the thin Gut between the Bile and the Pancreatick Juice. For the taking away the Obstruction, temperating the more acid Pancreatick Juyce, and the diminishing the Cold, from thence proceeding, these following Medicines do much conduce, viz. *Water of Parsly, Fennel, Baume, Simple Treacle-Water, Salt of Worm-wood, of Centaury, the lesser, Syrup of Cardus Benedictus*, or the five opening Roots, and the like, being mixed according to Art, especially if taken halfe an hour before the feaverish Cold invades the Sick, who ought to be kept in his bed, or other warm place, that Sweat may

be a little promoted, or at leastwise that the operation of the Medicine may not be hindered.

We say half an hour before the feaverish Cold invade the Sick, because Reason teacheth, and Experience proveth, that cutting and attenuating, as unobstructing Medicaments do then with a far more happy Success absolve that for which they are Administred, than if they were exhibited at any other time; the Reason of which seemes to us, because those Medicines begin to operate at that time, wherein the Pancreatick Juice by its Acrimony doth molifie the Obstruction, and so by a united force, may more strongly and more happily dissolve the Obstruction, than if either of those only were operating: Moreover, It very much diminisheth the Feaverish Cold, which as yet would be performed with greater success, if to the mixture even now described, you shall add a drop or two of Oyl of Cloves, because as yet we see no medicament that doth more powerfully take away Cold than that Oyle.

If a great Heat follow the feaverish Cold, to attemper that Medicines called Refrigeraters, among which aqueous things diluting the Bile seems to us most agreeable, but especially Acids with which the acrimony and volatillity of the saline Bile exceeding, producing Heat and burning is best infringed. For as Doctor *Minrotus* saith pag. 36. in his Treatise of Malignant Feavers, *Acids* ~~so~~ *represent*

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repress the inflamability of a Sulphurous Matter without the Body, so also within the Body they bridle the inflaming Bile.

So Hippocrates. De Victu Acutor. Text. 29. 9. manifestly Teacheth that Acids do infringe and mitigate the Bile. And this is the Reason, why the most skillfullest Physicians do daily prescribe Acid Julips for the temperating of that feverish Heat; as for Example, by the Decoction of Barley, or coolling distilled Waters with Syrup of Limmons, Mulberries, or Barberies, &c. By adding Spirit of Vitriol, Oyl of Sulphur per Capanum, or other Acid Spirits in a sufficient quantity to give it a grateful Acidity. For the same end they also sometimes prescribe Apozems of the opening Roots, the Herb Sorrel, Lettice, the greater Houfleeck, Tamarinds, &c. by adding after the boyling, some Acid Syrups, and an acid Spirit sufficient for a grateful Acidity, that the sick may now and then take a small Draught thereof to temperate the Heat.

If a great Thirst afflict the Feaverish at the time of Heat, half a Dram of *Lap. Prunella* may be conveniently dissolved in the aforesaid Apozeme, or in small Ale, or in a convenient Julip, for it excellently extinguisheth Thirst; and therefore those to whom Drink is hurtful, may dissolve the same Medicament in Water, but in a greater quantity, to wash the Mouth. Here it is well to be noted, that at the time of the Heat, it is not necessary that the Sick should ab-

stain from moderate Drinking, which at the time of Cold is altogether required; because we daily see, that if Drink be assumed at the time of the Cold fit, that it is augmented, and the Sick more troubled.

If the Medicaments, even now mentioned for Example, do not take away the Feaver, in the Intervals wherein they are not vexed with the Feaver, this following mixture will much avail. *R. Fennel Water three Ounces, Simple Treacle Water six Drams, distilled Vinegar three Drams, Crabs Eyes prepared half a Dram, Syrup of the five opening Roots, half an Ounce mixt.* Of which most simple mixture, let one spoonful be taken every two houres; for altering Medicines do operate far better if they be taken by Intervals, then if they be taken abundantly together and at once. If vehement Paines and Watchings do accompany the Feaver, Mixtures are to be used in the Intervals, to which is added, one Grain of *Laudanum Opiatum*, which Medicament we do believe hath also a force of temperating the acrimony of the Humours, because we see that Paines arising from the Acrimony of Humours, remain not after Sleep procured by the prudent assumption of *Laudanum Opiat*; which in our Opinion could not happen, if that *Laudanum* had not a force of temperating sharp Humours.

If a pain of the Head accompany the Feaver; in stead of fennel water, that of bettony, or burrage, may be substituted; and in
place

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place of the Syrup of the five Roots, Syrup of *Diacodium*, or white Poppies. But if the Stomach be evilly affected, Water of Mint or of *Carduus Benedictus* will be used with better success. If the menses flow not, Water of Peniroyal, Syrup of Mugwort, &c. may be exhibited. If a suffocation of the Womb be present, in stead of those, may be added Spirit of *Sal Ammoniack*, Tinct of Castor, &c. if the Sick be tormented with flatulencies, Spirit of Nitre may be added; which remedy doth greatly help those which are troubled with a collick Passion, or any other flatulent Diseases; especially if some Drops thereof be prudently mixed with some Aromatick Waters, and the aforesaid Carmi-natives. If the Appetite be prostrate by Reason of too great a quantity of Bile carried to the Stomach, which will be known by the Appetite suddenly Destroyed, by bitter Belchings and Cholerick Vomiting, two Scruples of Elixir *Proprietatis Paracelsi* may be added to the last mixture. But if the said evil proceedeth from a vici'd pitiuity detained in the Stomach, which will be known by an aggravated pain in the Stomach, half a Dram of the dulcid Spirit of Salt instead of Elixir *Proprietatis* will be more Conduent if it be mixed with the foresaid mixture.

To the same intent may be directed also divers Apozemes, and other medicate Wines, Powders, Pills, and medicaments against the said Obstructions; Nevertheless you must di-

diligently Note, that Apozemes and other Medicaments especially refrigerating which promiscuously they daily compel the Sick to swallow down in a great Dose, sometimes so debilitate their Stomacks that the Appetite is thereby not only Destroyed, but sometimes fall into a disdain or Loathing of Aliments, from whence a new Affliction is added to the Sick, and the latter Error is also very often worse than the first. But if notwithstanding before the Physician hath attained his desired end, he thinketh some other Humour doth offend by too much plenty, that may be diminished with convenient medicines.

The Diet according to the diversity of intermitting Feavers, must sometimes be changed, because Tertian Feavers accompanied with the greatest Heat, do require a Diet more Cooling than Quartans which very often afflict the Sick with intollerable Cold and Trembling: For we see the moderate use of French Wine, which we are wont to forbid in all Tertians, sometimes to be granted in Quartans. But such a Diet as may be agreeable to all intermitting Feavers, every one may gather from what we have already spoken.

We would have further propounded some other Remedies as well accommodated to intermitting Feavers as to their Symptomes, had not the most Famous Doctor Sylvius in the first

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first Part of his *Praxis* already Printed,
proposed many, and the most excellent of
them.

*From my Study, Feb. 2d. 167 $\frac{5}{6}$,
at the Signe of the Globe,
and Chymical-Furnaces, in
the Poltern, near Moor-
Gate, London.*



FINIS.



L. 4

Post.

POST - SCRIPT.

I Have taken notice of many People (especially of the Poorer sort) who are afflicted with tedious Agues, and many more, who labour under those Deplorable Fits, commonly called the Fits of the Mother, and Spleen; as also, the Falling Sickness, Grievous Convulsions, &c. And being well satisfied, (as well by the means of Curation, as the undenyable Experiments, and valid Reasons in this Book, confirming the same) that those Diseases, with many more, derive their Original from the Vitious Alteration of this Juice, of the Sweet-Bread: I, for the sake of poor People, that they might have help at an easie Rate, hereby let them know, that (amongst many other) I have two Medicines, which are certain in the Cure of the fore-mentioned Diseases. The one will dissolve the Conjoint Matter of all Ague-Fits, with great Celerity; it being of such Subtile Parts, that it quickly penetrateth, and openeth those Obstructions in the Lateral Branches of the Pancreas, or Sweet-Bread, from whence those Agues proceed. The which Medicine alone (with the help of a proper Purge, to carry off the Matter after it is dissolved, and attenuated) will, in a short time, Cure the Fits of any Ague whatsoever. It is put up in Glasses,

Post-script.

ses, and sold at the Price of half a Crown each Glasse, with Directions for the use thereof; one Glasse being sufficient for the Cure of an Ague that is but of a short Continuance.

The other Medicine is a Specifick Remedy, against the Fits of the Mother, Hypochondriack Paines, and Melancholy, Vapours arising (as is generally said) from the Spleen, and Womb: As also, against Convulsion Fits, Falling Sickness, and Vertigoe, or Giddiness of the Head: In which Cases, those who have made frequent use thereof, have found it to answer their Intention. This is also sold at half a Crown a Glass, with Directions for its Use. These Medicines are sold at my own House, and at no other Place; Where also may be had all Chymical Medicines in use, truly prepared; such as are safe, and effectual in Operation, and able to abide the Test of the most Curious Examiners: This being added for the Information of Physitians, Chyrurgions, and Apothecaries, who may have occasion to make Use thereof.

From my House at the Signe
of the Globe, and Chymi-
cal - Furnaces, in the Po-
stern - Street, near Moor-
Gate, Feb. 16th. 167².



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